ANALYTICAL RESULTS REPORT

JONES AND PARDEE SMELTER

Salt Lake County, Utah
UTD988075263

Utah Department of Environmental Quality
Division of Environmental Response and Remediation
Prepared By: Helen L. Sadik-Macdonald

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1.0 INTRODUCTION

Under authority of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as amended and in accordance with applicable provisions of the National Contingency Plan, the Utah Department of Environmental Quality, Division of Environmental Response and Remediation (UDEQ-DERR) inspected the Tanner Flat Campground in the mid-reach of Little Cottonwood Canyon. Situated between the White Pine Slide (the upper bounds of Tanner Flat) and the west end of Tanner Flat (Campground), the former Jones and Pardee (J&P) Smelter was located in the early 1870's. The U.S. Environmental Protection Agency (EPA) requested sampling of the J&P Smelter site (UTD988075263) in Salt Lake County, Utah to complete a Site Inspection (SI) which would evaluate groundwater and soil contamination and delineate targets in the site vicinity.

2.0 OBJECTIVES

An investigation of the J&P site was conducted to determine whether any release of hazardous substances to the environment has occurred as a result of historical smelting operations. A release of hazardous substances creates a potential for listing on the National Priorities List. Up-gradient and down-gradient samples of soil, stream sediment, surface and ground water were collected. The presence of slag material and/or stressed vegetation was used for location of sample collection sites. An SI Data Summary is included as Appendix A.

3.0 SITE DESCRIPTION

3.1 Site Location and Description

The J&P Smelter is located on Little Cottonwood Creek at the Tanner (aka Tannerville) Flat campground on Utah highway 210, in Little Cottonwood Canyon, within southeastern Salt Lake County. This site is approximately 6 miles above the mouth of Little Cottonwood Canyon in the center of the west half of Section 11, Township 3 South Range 2 East. The Salt Lake County Recorders office had no record of land holding at this location in the canyon during the 1870's, 1880's or 1890's. It was not until some time after 1896, when Utah became a state, that all property transactions were recorded in their respective counties (Recorder, 1995).

The smelter property is believed to have been approximately 20 acres and located outside of the town of Tannerville, approximately 4 miles below the mining town of Alta (Howard, 1993). It is not known where within Tanner Flat the smelter was located, however. Utah Highway 210 bounds Tanner Flat on the north, Little Cottonwood Creek bounds the flat on the south and the White Pine slide bounds the property on the east. The canyon narrows at the west end of Tanner Flat Campground. Tanner Flat lies within the flood plain of Little Cottonwood Creek (Figure 2a). No evidence of smelter activity or foundation stones were observed on the site reconnaissance of June

13, 1995, nor on the days of sampling in November, 1995. Small to very small pieces of slag were observed over a large area between the campground and the White Pine slide during both visits to the area. The Tanner Flat campground is within the National Forest Service system and leased to private operators for campground management. Two resident couples manage the campground for the four to five months it is open during the summer and early fall.

3.2 Operational History and Waste Characteristics

The J&P Smelter was a historic custom smelter where lead carbonate ores from mines in Alta were smelted in 1871-1873 (Leichter and Adamson, 1941). This was the beginning period of the smelting industry in Utah. "The technology was new and relatively unknown to the men who began smelting, and as a result, the industry failed to run [efficiently]" (Hughes, 1990). Presumably Jones and Pardee built the smelter in 1870 or early 1871. It consisted of one cupola and blast furnace with an 8-ton daily charge capacity (Fabian, 1873). The smelter was sold to Wellington Mining and Smelting Works (incorporated in San Francisco, January 1872, presumably the sale date) to work ores from Wellington mine and custom ores from other mines in the Alta vicinity. Production in 1872 was 110 tons of bullion with 225 ounces silver, gold and lead to the ton (Fabian, 1873). Location of the J&P Smelter is shown on an early Bureau of Land Management survey map included in Appendix B.

3.3 Previous Investigations

Utah DERR, CERCLA branch, completed a PA for the J&P Smelter site in October 1992. A Site Inspection of the J&P Smelter was requested by EPA's CERCLA Site Assessment Branch in September 1992.

4.0 FIELD ACTIVITIES

4.1. Sample Collection and Field Observation

Helen Sadik-Macdonald and Elizabeth Yeomans of the DERR collected samples from the site on November 7, 1995. Ms. Sadik-Macdonald collected surface water samples from Little Cottonwood Creek near and downstream of the site on November 8, 1995. Sample collection was conducted in Level D protective clothing. A detailed Site Health and Safety Plan was reviewed by involved parties prior to beginning of field work. A signed and dated Tailgate Safety Meeting form was reviewed with the field personnel at the start of each field day. These documents are maintained in the DERR's site files.

At the time samples were collected, the campground had closed for the winter (November 7-8, 1995). The camp's water supply had been shut in, and the ingress/egress gate to the campground locked. The two days spent sampling were cool (40s°F), partly sunny with a light up-canyon breeze.

Leaf litter covered the ground. A few bits of slag were observed within the campground in soils at the amphitheater and a large open area west of it. Slag was found ¼-mile east of the campground in a wooded flat area just below the White Pine Slide. Except for a large 2-foot by 5-foot piece of rusty steel and an aged telephone pole found in the wooded flat area, no other historical evidence of man's presence in the Tanner Flat area was observed during the field sampling.

Eighteen samples were collected for the evaluation of surface water and sediment, soils and ground water in the vicinity of the former smelter. Two quality assurance/quality control (QA/QC) samples were included in the total. Three ground water sites were sampled with one sample duplicated for QA/QC. Four surface water locations were sampled with one co-located sediment sample taken with each. Five soil and/or source samples were collected from in and around the campground. One deionized water trip blank was taken for QA/QC purposes. Photographs of sample locations are included in Appendix B, Field Activities Report. Site access was arranged by the Project Manager with the U.S. Forest Service and the Consent for Access Agreement is included in Appendix C.

4.2 Quality Assurance/Quality Control (QA/QC)

Sampling proceeded according to methods outlined in the DERR CERCLA Quality Assurance Project Plan (QAPP) of November, 1989 (Utah Dept. of Health, 1989). Water samples were collected in 1-liter polyethylene (poly) bottles and preserved with nitric acid to a pH of less than 2. The poly bottle was submerged below water surface for filling. Two milliliters of nitric acid were added to each poly bottle after filling and the pH checked with pH indicator plastic strips to verify acidification to less than pH of 2. The soil and sediment samples were collected with stainless steel kitchen spoons decontaminated (deconned) in the DERR office prior to use in the field. Each soil and sediment sample was removed with a clean spoon and collected directly into laboratory certified clean 8-ounce glass jars. Surface water samples were collected from downstream to upstream on November 8, 1995. Jars and bottles were labeled in accordance with Contract Laboratory Procedure (CLP) guidelines and as directed in the QAPP.

The above-mentioned environmental samples were preserved by cooling with ice to 4° C. Water and soil samples were analyzed for total metals content. Samples were shipped as environmental samples via strict chain-of-custody to Southwest Labs of Oklahoma in Broken Arrow, Oklahoma. Southwest Labs of Oklahoma is a contract laboratory registered under EPA's Contract Laboratory Program (CLP). The samples were analyzed under Routine Analytical Services (RAS) for total metals analytes. Data validation was conducted by the Environmental Services Assistance Team in Denver, Colorado and deemed acceptable as qualified. The analytical data is included in Appendix D.

Quality Assurance Samples

- Trip Blank - Sample JP-SW-01. A carbon-filtered deionized water sample was prepared at the DERR office and traveled with the surface water samples as they were collected on November 8, 1995. The trip blank was treated and analyzed as a normal water sample. This sample was taken to assess whether the sample containers, preservatives, and/or field conditions added to the contamination levels of all samples.

- A Decontamination Blank was not collected because no field decon took place.

- Replicates - One blind duplicate water sample pair , JP-GW-01 and JP-GW-04, from ground water was collected as QA/QC check for the laboratory.

No split samples were requested by the landowners.

5.0 WASTE/SOURCE CHARACTERISTICS

5.1 Waste/Source Description

Waste at the site consists of slag, a by-product of the smelting process, and soils contaminated from airborne particulates carried out of the smelter stack. Slag is visible in small quantities over several acres of undeveloped land east of the campground and within the campground. The slag is generally pea gravel sized, but distinctive in its density, dark metallic luster, and bubble-riddled appearance. There is no containment of the slag at the site and the slag extends downslope into Little Cottonwood Creek. No readily visible signs of soil contamination such as stressed vegetation from stack emissions or slag were noted in the November 7-8 site visits. No fences or barriers restrict public access to any part of the campground or the undeveloped area to the east.

5.2 Sample Locations

One sample, JP-SS-01, was collected from what was originally believed by the project manager to be the center of the smelting operation at the east end of the Tanner Flat (Figure 2a). No other specific source samples were collected.

5.3 Analytical Results

Sample JP-SS-01 had four metals that exceeded three-times Inorganic Background Soil Samples for the Salt Lake area (Appendix E). The four metals were copper, magnesium, manganese, and vanadium. These metals are not specifically related to smelting processes previously evaluated by the DERR from Utah's early period of smelting (the 1860's and 1870's). Two soil samples, JP-SO-

03 and JP-SO-04, as will be shown below, have metals values that are characteristic of smelting operations and exceed three-times Salt Lake area background values for these metals constituents.

5.4 Conclusions

Concentrations of metals in sample JP-SS-01 were not definitive of a central smelter operation in the Tanner Flat area.

6.0 GROUND WATER PATHWAY

6.1 Hydrogeology

Groundwater in Little Cottonwood Canyon flows westward to the canyon mouth, then in a general direction toward the Jordan River. Depth to the water table in the Tannerville flat area is from 0-15 feet within stream alluvium (Seiler and Waddell, 1984). Most groundwater inflow is through cracks and fractures in the basement rock which forms the canyon walls and underlie the stream beds (Freethy, et al, 1994). Fractured basement rocks and coarse sedimentary materials within the Wasatch Mountains annually receive large amounts of precipitation which feeds the subsurface inflow. This subsurface inflow, in conjunction with other canyon streams that flow westward from the Wasatch Mountains toward the Salt Lake Valley, provides ground water recharge to the principal ground water reservoir within the Valley (Schlotthauer, et al, 1981).

6.2 Ground Water Targets

The Little Cottonwood Creek drainage basin lies within the recharge zone of the principal aquifer of the Salt Lake Valley. Hazardous materials originating at the J&P Smelter site may have leached or are leaching into Little Cottonwood Creek and the underlying sediments. Leachate reaching the principal aquifer of the Salt Lake Valley may cause elevations of metals associated with smelting in down-gradient wells. Well water available to visitors at the campground originates from a spring on the south canyon wall, several hundred feet above the campground. Percolation of snow melt and rain water through soils and sediments containing heavy metal concentrations derived from stack emission particles and/or slag materials is also of concern.

Four miles downstream of the site is the Wasatch Resort community of 25 homes and cabins, 12 of which are year-round dwellings. This community derives its water from the Wasatch Resort East and West Springs located above the stream bed on the south side of the canyon. This community's water was not sampled because the spring source is not in sediments downstream of Tanner Flat. Surface water used for culinary purposes is diverted at this community to the Metropolitan Water Treatment plant below the canyon mouth. This surface water use is further described in section 7.1.

6.3 Ground Water Sample Locations

Two water wells/springs have supplied the campground in the past, but only one is in service now. Sample JP-GW-01 was collected from the water supply to the campground (Figure 2b). The water supply reservoir (holding tank) is adjacent to the campground resident managers campsite. Samples from two ground water supplies, both mine tunnel drainages, in the Snowbird area were collected for background. These were JP-GW-02 (Peruvian Tunnel) and JP-GW-03 (Wasatch Tunnel) samples. Sample JP-GW-04 was collected as a duplicate of JP-GW-01.

6.4 Analytical Results

Analyses were conducted for total metals only. Samples JP-GW-01 and duplicate GW-04 were in very close agreement with each other. Both samples had very low levels (below drinking water maximum contaminant levels - MCLs) of metals of concern. The metals of concern in this case and typically associated with smelting are arsenic, cadmium, and lead. Of the two background ground water samples (GW-02 and GW-03), JP-GW-02 taken from Snowbird resort culinary water supplies, had metals values below drinking water MCLs in all metals analyzed for except thallium, which had a value of 4.4 micrograms per liter (μg/l). The MCL for thallium is 0.5 μg/l. Background sample, JP-GW-03 exceeded MCLs for antimony, cadmium, and manganese in the raw feed to the water treatment plant located within the Wasatch tunnel. In the treatment plant, most of the metals are precipitated out, except antimony (exceeds MCL), before discharge to Little Cottonwood Creek.

6.5 Conclusions

Ground water sampled from the Tanner Flat campground water supply does not appear to be affected by smelting processes from the former J&P Smelter. Levels of metals in the sample were all below MCLs. Background samples collected from the Snowbird area were taken from mine drainage of former silver and gold mines that have water of sufficient quality and quantity to be used for culinary purposes after treatment, with the exception of antimony. The ground water samples reflect the composition of intrusive rocks and mineralized zones of the Little Cottonwood batholith but do not appear to exhibit smelter effects of the J&P Smelter.

7.0 SURFACE WATER EXPOSURE PATHWAY

7.1 Hydrologic Setting

Little Cottonwood Canyon provides the entire watershed for Little Cottonwood Creek. The creek flows westward for 10 miles from the head of the canyon to the mouth. At the mouth, it turns northwestward for a 6½ mile journey to central Salt Lake Valley and the Jordan River. Several springs emanate from the mountainsides at and above Tanner Flat. Many mine tunnels in the vicinity

and Alta area have water flowing from their portals to the Creek. A few springs and mine tunnels provide culinary water supplies for Snowbird resort and Alta. Springs supply potable water to the Tanner Flat campground. The steep gradient Little Cottonwood Creek travels down the canyon provides Whitmore Oxygen of Salt Lake an opportunity to draw hydroelectric power from the stream at its small hydroelectric plant approximately 2½ miles below the site.

A penstock for culinary water diverts Little Cottonwood Creek water at the upstream side of Wasatch Resort, approximately 4 miles below the site. The water is diverted through the penstock into an aqueduct which carries the flow directly to Murray City's Hydroelectric Power Plant beyond the canyon mouth and 6½ miles below the site. From the plant, water immediately enters the adjacent Metropolitan Water Treatment Plant where it is purified and distributed. No significant wetlands lie within the creekbed until near the mouth of the canyon, where approximately 6 miles downstream from the site, the Beaver Springs are intersected and flow to the creek. There are several acres of wetlands associated with Beaver Springs and a few more acres further downstream (Appendix G).

7.2 Surface Water Targets

Little Cottonwood Creek flows by the southern boundary of Tanner Flat. Slag extends into the creek. Tanner Flat lies within the Creek's floodplain, approximately 4-6 feet above normal water level. The J & P Smelter was located within the flat, though the exact location is not known at this time. Creek water is treated for culinary purposes at the Metropolitan Water Treatment Plant 6½ miles downstream. The point of diversion for this water is immediately upstream of Wasatch Resort. Typical raw water analytical results at the water treatment plant are included in Appendix F. Heavy metals in the water supply stream that reach the plant are removed by flocculation. The creek flows through wetland areas within the 15-mile downstream reach.

7.3 Surface Water Sample Locations

Four samples of surface water and co-located sediments were collected for the J&P investigation (Tables 3 and 4). Sampling began at the downstream location of Wasatch Resort (JP-SW-04 and SE-04) and proceeded upstream approximately 4 miles to the next sample location at the Tanner Flat campground drainage confluence with Little Cottonwood Creek (JP-SW-03 and SE-03; Figure 2b). Another ½-mile upstream, JP-SW-02 and JP-SE-02 were collected. The most upstream and background sample set was collected last at the White Pine slide (JP-SW-05 and SE-05). Sample JP-SW-01 was a trip blank and no co-located sediment was collected with it.

7.4 Analytical Results

Table 3 summarizes results of samples that were collected from surface water in Little Cottonwood Creek. No metals exceeded safe drinking water MCLs except thallium (2μg/l), and the thallium

MCL was exceeded in all surface water samples except JP-SW-03 which was non-detect at 4μg/l, 2μg/l above the MCL for thallium. Table 4 summarizes the co-located sediment results. The two samples collected next to Tanner Flat, JP-SE-02 and JP-SE-03, had arsenic values that exceeded 100 mg/kg and lead values that exceeded 1000 mg/kg, respectively. Arsenic, beryllium, and manganese exceeded the soil reference dose screening concentration in the three samples collected above Wasatch Resort.

7.5 Conclusions

Metals concentrations in surface water decrease downstream from the White Pine slide to Wasatch Resort, a distance of approximately 5 miles. The highest concentration of total metals was found in the most upstream sample, JP-SW-05, taken approximately one mile above Tanner Flat. The lowest concentration was at Wasatch Resort, the most downstream location of JP-SW-04. Several small tributaries, underflow and springs flow into Little Cottonwood Creek along its downstream path, increasing stream volume and effectively diluting metal constituents. Surface water in Little Cottonwood Creek does not appear to reflect smelter effects from the J&P site.

8.0 SOIL EXPOSURE PATHWAY

8.1 Physical Conditions

The J&P site is situated on the Oligocene Little Cottonwood batholith. The Little Cottonwood batholith is a quartz monzonite intrusive approximately the size of a six-mile square township. Seventy percent of Little Cottonwood canyon incises the batholith (Bryant, 1992). This intrusive rock is very light grey, porphyritic, and contains biotite, phenocrysts of orthoclase (potassic) feldspar, greater than two percent quartz, and small amounts of hornblende. Poorly sorted glacial till consisting of large boulders of Pinedale age (Pleistocene) and angular Holocene talus form deposits on the canyon floor to a thickness of 30 feet or less (Bryant, 1990). A narrow band of Holocene stream alluvium underlies Little Cottonwood Creek (Freethy, et al, 1994).

During the Pleistocene epoch, the canyon was deeply cut by a glacier that extended into ancient Lake Bonneville. The glacier was 12 miles in length (Stokes, 1986). Little Cottonwood Canyon is a well preserved classic U-shaped glacial valley. Deposits of glacial outwash extend into the Salt Lake Valley almost a mile beyond the canyon mouth. Poor soil accumulations on the glacier scoured, steep-sided quartz monzonite canyon walls preclude establishment of much vegetation. Several avalanches and rock slides occur each year in the canyon.

The Soil Survey (Harvey, 1987) for Summit Area including parts of Summit, Salt Lake, and Wasatch Counties designates the Tanner Flat area as Poleline gravelly loam. Poleline has 10-40 percent slopes on deep, well drained soils at 7,000 to 8,800 feet of elevation. Average annual precipitation

is 25-35 inches with a mean annual air temperature of 36-42 degrees Fairenheit. To the east of Poleline is Rock outcrop (White Pine Slide). It consists of rock exposures with less than 4 inches of soil cover on bedrock and generally steep to very steep slopes.

8.2 Soil Targets

Tanner Flat has 35 campsites as of this writing and is heavily used throughout the summer months (Figure 2b). The occupancy rate is 80 percent during the week, 100 percent during weekends Vanderberg, 1996, personal communication). The number of on-site residents is four resident managers during the months of operation (June-October). The campground managers are hired by concessionaires to the National Forest Service and are generally retired couples (L & L, 1996, personal communication). A coworker reported to the author a child claiming to "live up [there]" played with his son when he camped there in the summer of 1996. L & L said they do not alway meet their campground hosts in the interview process and they cannot always be sure if they have children with them or not. This management company will occasionally accept one or two children.

Population recorded by block data for the ¼-mile radius of the site is 6 and within ½-mile radius 12, as of the 1990 Census (Appendix H). (Note, these numbers are from best fit data. The census block the J&P site is located in occupies a majority of the canyon floor. Population numbers are generated as a percentage of block area of interest as though people are evenly distributed throughout the block. In reality, the nearest residents are located at either Wasatch resort 4.5 miles down-canyon, or Snowbird, two miles further up-canyon.) The campground resident managers, generally two couples, would be considered the only residents and they are part time.

The east end of the flat where the former smelter was originally thought to be, is a broad flat area with boulder rubble from road building of the canyon highway above and overgrown with trees and shrubbery. An overgrown road bed appears to have existed alongside the creek above this area, but it's eastern extension is lost in more boulder rubble. Pea-sized particles of slag were observed scattered over approximately 10-acres in this area (see Photos in Appendix C).

8.3 Soil Sample Locations

Soil sample JP-SS-01 was collected as a source sample from the immediate vicinity of what was believed to be the former smelter grounds and was discussed above in section 5. Up-canyon from JP-SO-01 approximately 500 yards, a background soil sample JP-SO-02 was collected from a primitive campsite. Two soil samples were collected from within the Tanner Flat campground in high pedestrian traffic areas (Figure 2b). JP-SO-03 was collected next to the campground amphitheater, across from the resident manager's campsite. Sample JP-SO-04 was collected from an area that had been cleared for future expansion of the campground. This future expansion site is planned for three 25-person group camp sites which is scheduled for completion in the spring of

in the spring of 1997 (Vanderberg, 1996, personal communication). A background soil sample, JP-SO-05, was collected from the mountainside north of Tanner Flat, approximately 300 feet above the campground. All soil samples were collected from depths of 0 to 6 inches below ground surface.

8.4 Analytical Results

The highest levels of arsenic and lead were found in samples JP-SO-03 and JP-SO-04, both in the middle of Tanner Flat campground (Table 1). Sample JP-SO-03 was the highest in arsenic and lead at a "qualified" 416 mg/kg arsenic (the matrix spike recovery was 67 percent, biased low for a contract required 75 percent recovery) and lead at 8670 mg/kg. Sample JP-SO-04 had 331 mg/kg arsenic (qualified, matrix spike recovery 67 percent) and 5030 mg/kg lead. Originally, the upper flat area was thought to be the smelter site as small fragments of slag were found along the north side of this area. Upon closer inspection, however, the campground had slag fragments scattered about it as well. The soil sample, JP-SS-01, collected from the upper flat area did not generally exceed Salt Lake area background values by more than 10 percent except for aluminum, magnesium and manganese. Aluminum and magnesium are not considered toxic. Manganese exceeded its soil reference dose screen concentration of 390 mg/kg by two to three times in all samples except one, sample JP-SO-02 (412 mg/kg). Background samples JP-SO-02 and JP-SO-05 are similar to Salt Lake area background soils, with the exception of manganese.

8.5 Conclusions

Although slag fragments were originally observed at the upper end of Tanner Flat, closer inspection of the campground revealed slag fragments scattered about it as well. Roadways within the campground are asphalt paved including parking for recreational vehicles. Most picnic tables are mounted on concrete slabs. Tent sites are smoothed dirt or covered with leaf debris. Total metals values for lead exceed 5000 mg/kg and arsenic at 300 mg/kg in two central Tanner Flat campground areas. These are high foot traffic areas during the warm months of the year when the campground has its highest usage. Direct contact with the soil via dermal or ingestion pathways is of concern in the campground area. Prolonged exposure to humans could pose a risk at these levels.

9.0 AIR EXPOSURE PATHWAY

9.1 Meteorology

Temperatures at the site are typically 20 degrees cooler than the Salt Lake Valley (Brough, 1987). The weather station at Alta, 3-4 miles above the site, receives more than twice the annual moisture (58.45 versus 22.4 inches) as a station located at the mountain front (Cottonwood wier, Big Cottonwood Canyon). Most of this precipitation comes from winter snowpack which averages 518.7 inches at Alta (Ashcroft, 1992).

In Utah, wind patterns vary from predominantly southerly to westerly in the summer to northwesterly in the winter. The daily wind speed averages 2.4 miles per hour (Stevens, et. al., 1983). During times of light winds, cold air from the head of Little Cottonwood Canyon flows westward down-canyon. The diurnal cycle of up-canyon winds during the day and down-canyon winds at nighttime is common in summer months.

Alta receives high snowfall accumulations due to the warming "lake effect" of the Great Salt Lake on passing storm fronts combined with compression against the Wasatch Mountains. Storm fronts migrating from the northwest or west are channeled toward the southeastern corner of the Salt Lake Valley where Little Cottonwood Canyon is located. In winter months the moisture-laden clouds stall and release, at times, large volumes of water in the form of snow.

9.2 Air Targets

Tanner Flat has 35 campsites with three additional 25-person campsites planned for construction in the spring of 1997 (Figure 2b). The campground is heavily used throughout the summer months (80 percent during the week, 100 percent during weekends). Direct contact via dermal or ingestion pathways is possible in the campground area. The number of on-site residents is two resident manager couples during the months of operation (June-October), but it is not often known if they have children (L&L, 1996, personal communication). No other residents live within a one-mile radius of the campground. As noted above, pea-sized particles of slag were observed scattered over most of the Tanner Flat area.

9.3 Air Exposure Pathway Analysis

Release of contaminants to the air from the former Jones & Pardee site is of lesser concern because the site is overgrown with trees and shrubs and open areas are restricted to foot traffic. Vehicular traffic is confined to paved roads. Walkers and hikers from the campground are likely explorers in the vicinity of the campground. Resident managers may experience Exposure to airborne dusts containing heavy metals could occur when dust is kicked up along foot paths and hiking trails.

10.0 CONCLUSIONS

The surface water pathway is not likely to be affected by the former J&P smelter. Ground water may be affected by infiltration of rain and snow melt. There are no water wells immediately downstream of the campground from which smelter impact could be evaluated. The amount of ground water flowing to the Salt Lake Valley from the Wasatch Mountains may be great enough to dilute effects of arsenic and lead from this smelter site. The soil pathway may pose a threat to human health as lead levels in the campground exceed 5000 mg/kg and arsenic exceeds 100 mg/kg.

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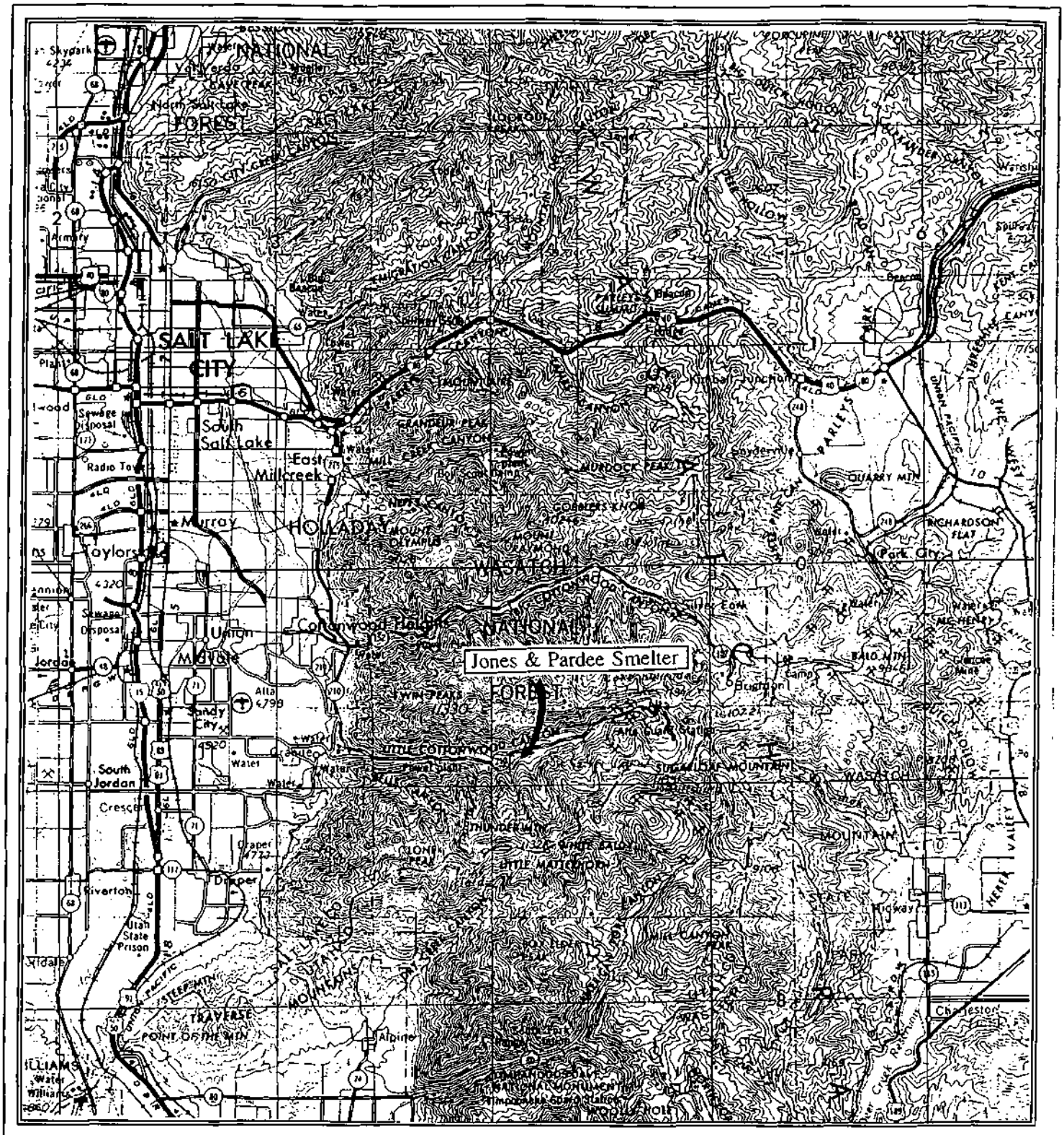


UTAH DEPT. OF ENVIRONMENTAL QUALITY
DIVISION OF ENVIRONMENTAL RESPONSE AND REMEDIATION

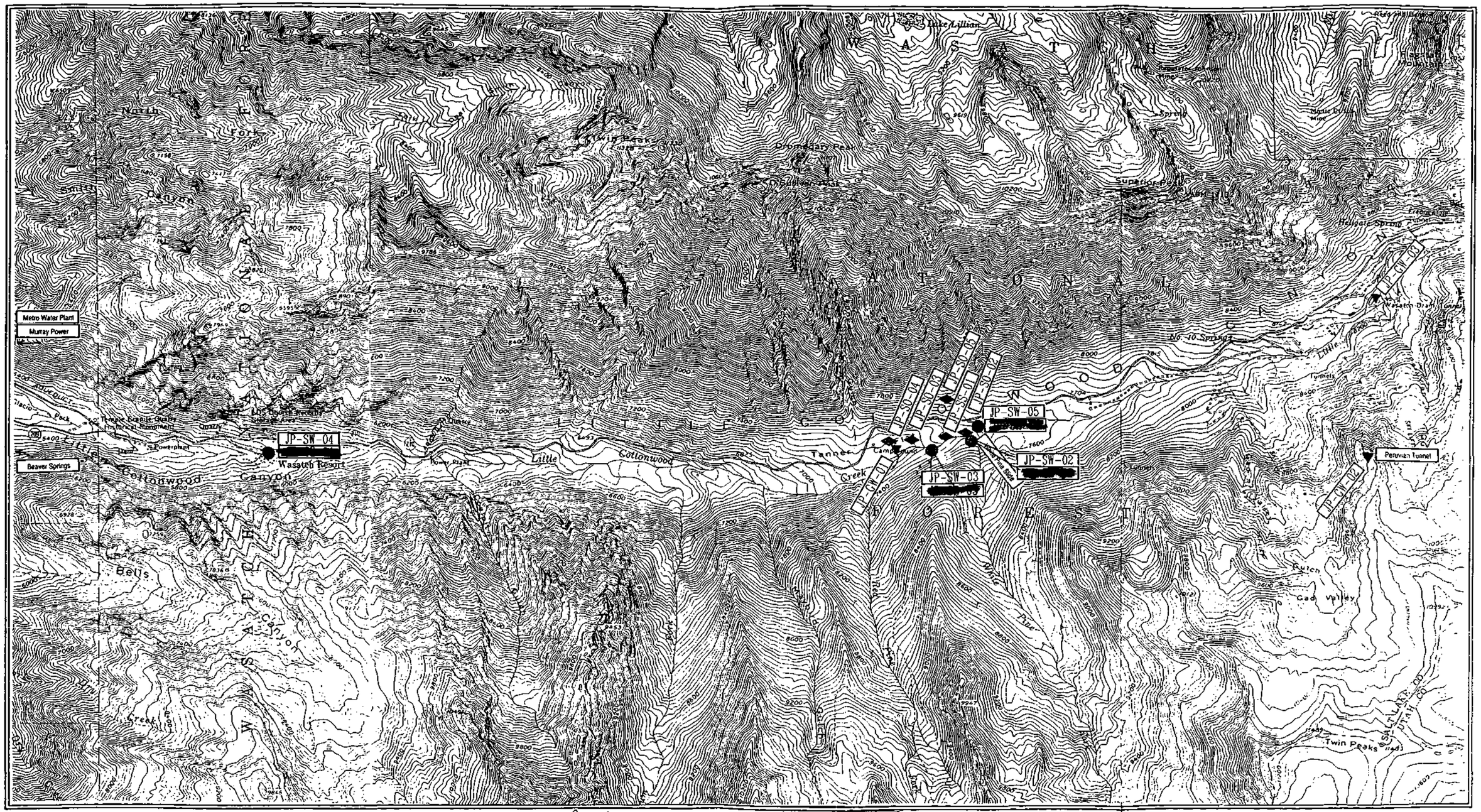
Figure 1

REGIONAL SITE LOCATION MAP

Jones & Pardee Smelter
Salt Lake County, Utah

By HSM | Date 8/3/95 | Scale 1:250,000

Source: 1:250,000 USGS Salt Lake City, Utah
- Wyoming Topo. Map. 1954, Rev. 1970



Legend

- ◆ JP-SO-02 — *Source and Soil Sampling Point*
- ▼ JP-GW-03 — *Ground Water Sampling Point*
- ● JP-SE-04 / JP-SW-04 — *Surface Water and Co-located Sediment Sampling Point*

N

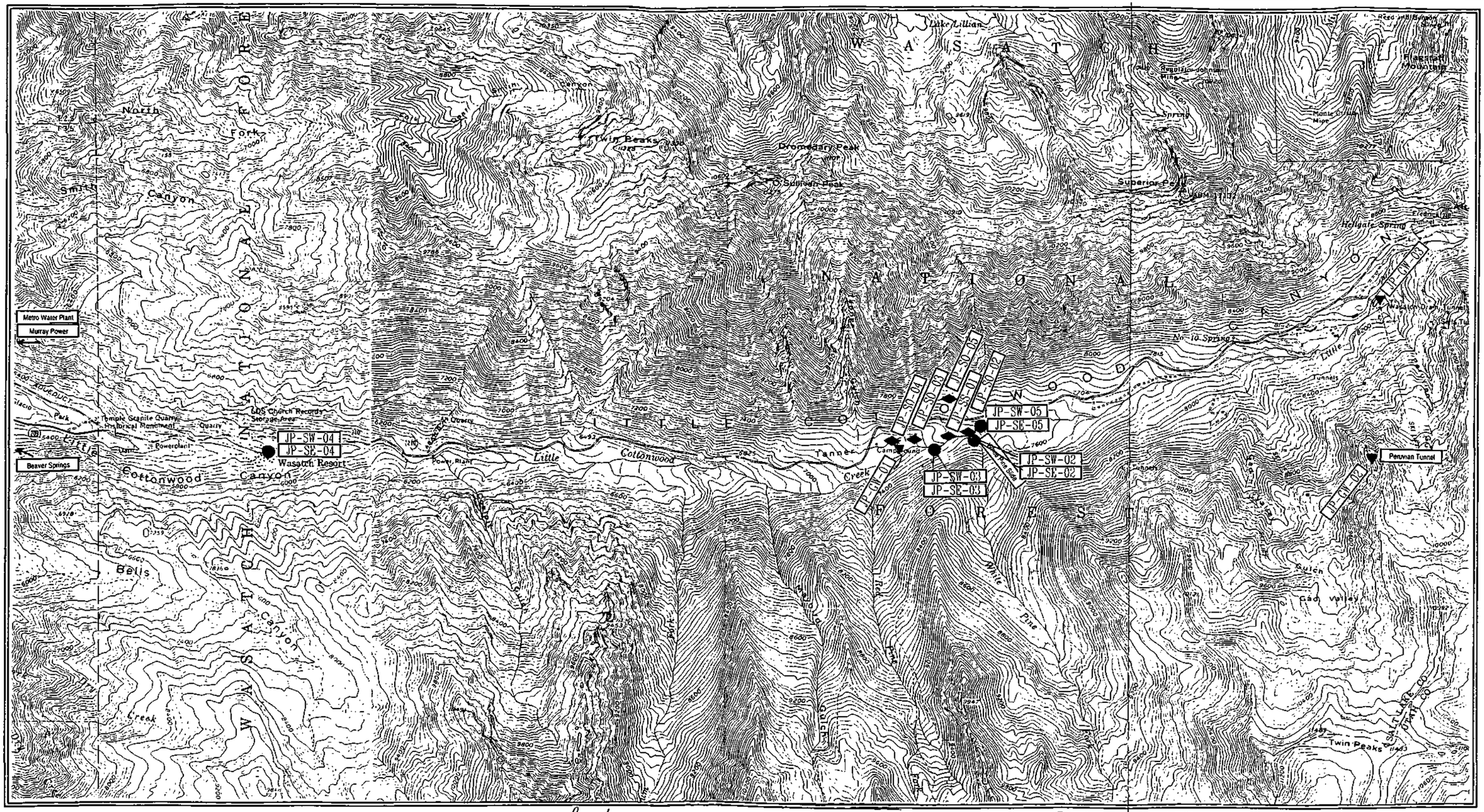
U.S.G.S. 7.5 min. Draper and Dromedary Peak quadrangles
1963 & 1955, photorevised 1969 and 1975.

UTAH DEPT. OF ENVIRONMENTAL QUALITY
DIVISION OF ENVIRONMENTAL RESPONSE AND REMEDIATION

FIGURE 2
SAMPLE LOCATIONS

Jones & Pardee Smelter
Salt Lake County, Utah

By: HSM Date: 9/5/96 Scale: 1:30,000



Legend

- ◆ JP-SO-02 — *Source and Soil Sampling Point*
- ▼ JP-GW-03 — *Ground Water Sampling Point*
- ● JP-SE-04 / JP-SW-04 — *Surface Water and Co-located Sediment Sampling Point*

N

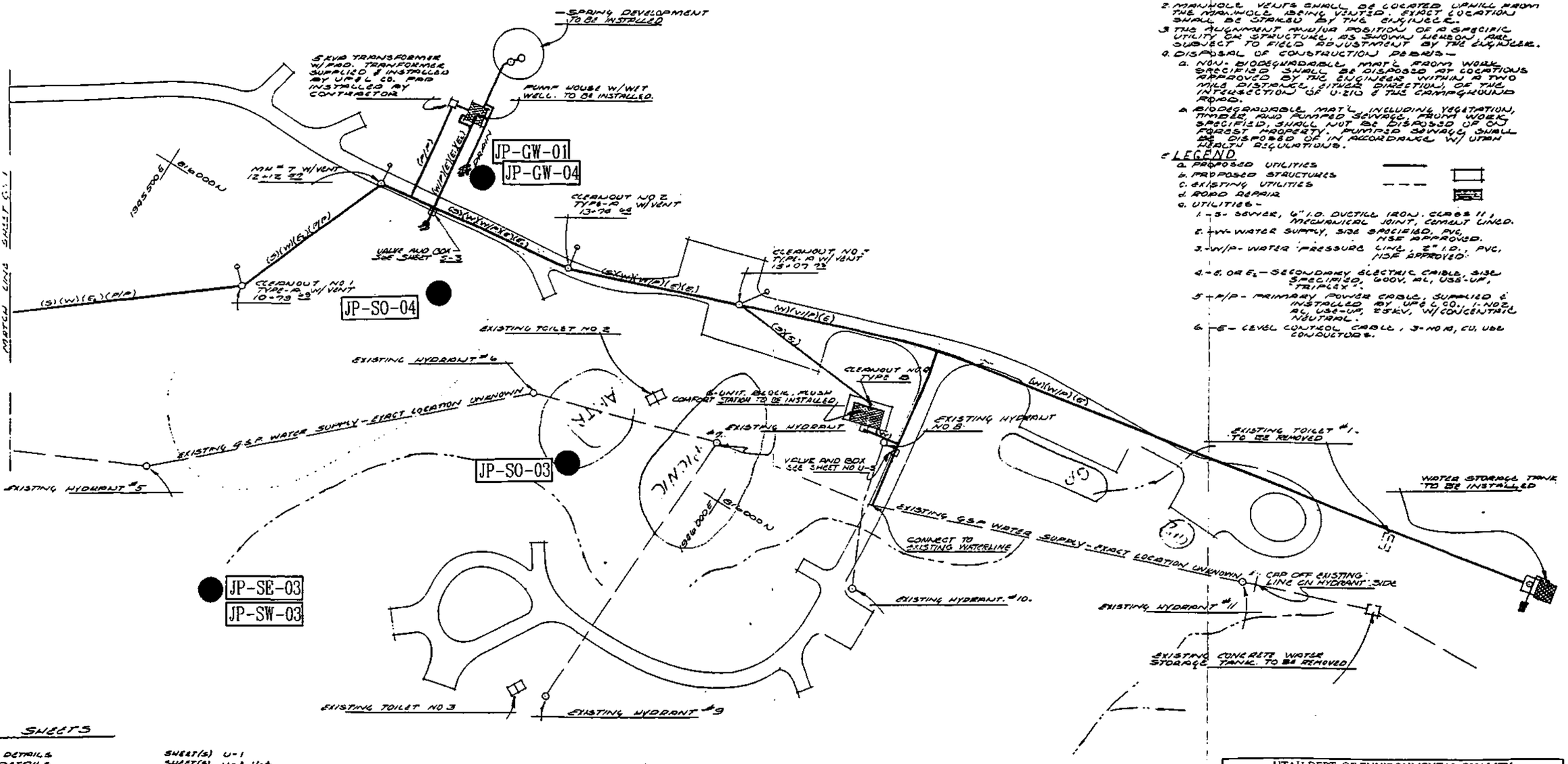
U.S.G.S. 7.5 min. Draper and Dromedary Peak quadrangles
1963 & 1955, photorevised 1969 and 1975.

UTAH DEPT. OF ENVIRONMENTAL QUALITY
DIVISION OF ENVIRONMENTAL RESPONSE AND REMEDIATION

FIGURE 2a
ALL SAMPLE LOCATIONS

Jones & Pardee Smelter
Salt Lake County, Utah

By HSM Date 12/16/96 Scale 1:30,000



GENERAL NOTES

1. CONTRACTOR SHALL CONSULT PROJECT DESCRIPTION, SHEET GS-2 TO CONFIRM WORK REQUIRED UNDER THIS CONTRACT.
2. MANHOLE VAULTS SHALL BE LOCATED UPHILL FROM THE MANHOLE BEING VISITED. EXACT LOCATION SHALL BE STAKED BY THE ENGINEER.
3. THE ALIGNMENT AND/OR POSITION OF A SPECIFIC UTILITY OR STRUCTURE, AS SHOWN HEREON, ARE SUBJECT TO FIELD ADJUSTMENT BY THE ENGINEER.
4. DISPOSAL OF CONSTRUCTION DEBRIS -
   a. NON-BIODEGRADABLE MATL. FROM WORK SPECIFIED SHALL BE DISPOSED AT LOCATIONS APPROVED BY THE ENGINEER WITHIN A TWO MILE DISTANCE, EITHER DIRECTION, OF THE INTERSECTION OF U-210 & THE CAMPGROUND ROAD.
   b. BIODEGRADABLE MATL. INCLUDING VEGETATION, TIMBER, AND PUMPED SEWAGE, FROM WORK SPECIFIED, SHALL NOT BE DISPOSED OF ON FOREST PROPERTY. PUMPED SEWAGE SHALL BE DISPOSED OF IN ACCORDANCE W/ UTAH HEALTH REGULATIONS.
5. LEGEND
   a. PROPOSED UTILITIES
   b. PROPOSED STRUCTURES
   c. EXISTING UTILITIES
   d. ROAD REPAIR
   e. UTILITIES -
      1 - S - SEWER, 6" I.D. DUCTILE IRON, CLASS 11, MECHANICAL JOINT, CONSULT UNCO.
      2 - W - WATER SUPPLY, SIZE SPECIFIED, PVC, NSF APPROVED.
      3 - W/P - WATER PRESSURE LINE, 2" I.D., PVC, NSF APPROVED.
      4 - 5, OR 6 - SECONDARY ELECTRIC CABLE, SIZE SPECIFIED, 600V, AL, USE-UP, "TRIPLEX".
      5 - P/P - PRIMARY POWER CABLE, SUPPLIED & INSTALLED BY UP&L CO., 1-NO 2 AL USE-UP, 25KV, W/CONCENTRIC NEUTRAL.
      6 - C - LEVEL CONTROL CABLE, 3-NO 18, CU, USE CONDUCTORS.

REFERENCE SHEETS

... FOUNDATION DETAILS	SHEET(S) U-1
...LE/VENT DETAILS	SHEET(S) U-3, U-4
...P HOUSE W/WIT WELL, DETAILS	SHEET(S) PH-1 to PH-6
...NG DEVELOPMENT DETAILS	SHEET(S) S-1 to S-5
...WATER STORAGE TANK DETAILS	SHEET(S) WS-1 to WS-4
... BLOCK, FLUSH COMFORT STATION DETAILS	SHEET(S) CS-1 to CS-5
...D REPAIR DETAILS	SHEET(S) RR-1, RR-2

Courtesy U.S. Forest Service

UTAH DEPT. OF ENVIRONMENTAL QUALITY
DIVISION OF ENVIRONMENTAL RESPONSE AND REMEDIATION

FIGURE 2b
CAMPGROUND SAMPLE LOCATIONS
Jones & Pardee Smelter
Salt Lake County, Utah

PROJECT NO. 19-75-1001

10-16-96 design date	checked by THOMAS	
drawn by		
scale in feet		

REVISIONS	
date	item

WASATCH NATIONAL FOREST
GENERAL SITE PLAN
TANNER FLAT UTILITY IMPROVEMENT

SHEET GS-2 of ____

Table 1
JONES and PARDEE SMELTER
Soil Sampling Total Metals Results
November 7, 1995

SAMPLE NO.	Salt Lake Area	SCDM	JP-SS-01	JP-SO-02	JP-SO-03	JP-SO-04	JP-SO-05
LOCATION DESCRIPTION	Inorganic Background Soil	Soil Reference Dose Screen Concentration	Upper East End, Overgrown Flat Area	Upper East End Primitive Campsite **Background**	Amphitheater Soil from Footpath	Campground Flat being Prepared for Improvements	South Slope Canyon Wall, **Background**
Date/Time			11-7-95, 11:00	11-7-95, 11:10	11-7-95, 12:30	11-7-95, 13:55	11-7-95, 16:20
ANALYTE	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Inorganic							
Aluminum	9749.		11900.	7960.	4350.	5550.	9250.
Antimony	10.3	31.	3.3 J	2.8 J	147. J	86. J	4.6 J
Arsenic	14.9	0.43*	14.1 J	38.5 J	416. J	331. J	22.2 J
Barium	178.3	5500.	164.	105.	48.8	121.	304.
Beryllium	0.78	0.15*	1.7	0.5	0.3	0.4	0.6
Cadmium	1.46	39.	0.5	2.6	52.6	21.7	5.5
Calcium	64302.4		74300.	3310.	55800.	11500.	16300.
Chromium	15.7		34.2 J	10.8 J	5.6 J	7.2 J	17.6 J
Cobalt	6.3		3.9	7.5	4.	6.1	7.3
Copper	50.5		152. J	46.4 J	1380. J	997. J	146. J
Iron	21527.9		16800.	16900.	13200.	15100.	15400.
Lead	127.5		190.	472.	8670.	5030.	551.
Magnesium	10493.5		31900.	4890.	16300.	7240.	8320.
Manganese	353.2	390.	1160.	412.	1100.	1470.	947.
Mercury	0.18	23.	0.1 U	0.2	8.8	14.8	0.2
Nickel	13.	1600.	4.2	11.2	6.9	9.5	10.6
Potassium	3155.3		3320.	3010.	1540.	2460.	4240.
Selenium	0.42	390.	1.1	1.2	2.6	2.2	1.5
Silver	1.84	390.	0.4 J	1.2 J	82.8	35.2	0.9 J
Sodium	1067.4		1270.	156.	742.	548.	211.
Thallium	0.38		0.8 U	1.1	1.4	1.	1.4 U
Vanadium	21.7	550.	109. J	21.3 J	13.9 J	14.8 J	29.5 J
Zinc	206.1	23000.	136.	186.	17300.	6970.	361.

* Cancer Risk Screen Conc.
J - Positive Result, estimated
U - Undetected; limit
UJ - Undetected, estimated result

Table 2
JONES AND PARDEE SMELTER
Total Metals Results
Ground Water November 7 - 8, 1995

SAMPLE NUMBER		SCDM	JP-GW-01	JP-GW-02	JP-GW-03	JP-GW-04
SAMPLE DESCRIPTION	Drinking Water Max Contaminant Levels	Drinking Water Reference Dose Screen Concentration	Campground Water Supply, From Overflow	Peruvian Tunnel, Culinary Supply **Background**	Wasatch Tunnel, Flow to Creek **Background**	**Duplicate** GW-01
DATE/TIME			11-8-95, 13:30	11-7-95, 14:30	11-7-95, 15:15	11-8-95, 13:40
ANALYTE	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
Aluminum			21. U	48.7	47.7	21. U
Antimony	6.	15.	3. U	3. U	9.5	3. U
Arsenic	50.	11.	2. U	2.	4.5	2. U
Barium	2000.	2600.	80.9	21.6	31.4	85.4
Beryllium	4.	180.	1. U	1. U	1. U	1. U
Cadmium	5.	18.	1. U	1. U	10.3	1. U
Calcium			33300.	35100.	48100.	35100.
Chromium	100.		1. UJ	1.8 UJ	1.6 UJ	1.6 UJ
Cobalt			1. U	1. U	1.1	1. U
Copper	1300.		2. U	3.4	217.	2. U
Iron	300.		11. U	68.	182.	11. U
Lead	15.		1. U	1. U	3.9	1. U
Magnesium			3000.	11200.	15200.	3130.
Manganese	(SMCL) 50	180.	1. U	2.6	93.2	1. U
Mercury	2.	11.	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ
Nickel	100.	730.	1. U	1.2 UJ	5.1 UJ	1. U
Potassium			2150. UJ	2810. UJ	2080. UJ	2930. UJ
Selenium	50.	180.	3. UJ	3. UJ	3. UJ	3. UJ
Silver		180.	1. U	1. U	1. U	1. U
Sodium			4740.	1600.	4450.	5140.
Thallium	2.		4. U	4.4	4. U	4. U
Vanadium		260.	1. U	1. U	1. U	1. U
Zinc		11000.	6.1	28.	1670.	6.2

SMCL-Secondary max. contam. level
U - Undetected; method limit
J - Pos. result, estimated
UJ - Undetected; estimated limit

Table 3
JONES and PARDEE SMELTER
Surface Water Total Metals Results
November 7, 1995

SAMPLE NUMBER		SCDM	JP-SW-01		JP-SW-02		JP-SW-03		JP-SW-04		JP-SW-05	
SAMPLE DESCRIPTION	Drinking Water Max Contaminant Levels	Drinking Water Reference Dose Screen Concentration	Trip Blank		Drainage from Upper Flat Area, Possible Smelter Site		Camp Drainage at L. Cottonwood Creek		Wasatch Resort Dam, Diversion		White Pine Slide Narrows Above Tanner CG **Background**	
DATE/TIME			11-8-96, 10:00		11-8-95, 13:15		11-8-95, 12:45		11-8-95, 12:30		11-8-95, 14:00	
ANALYTE	µg/l	µg/l	µg/l		µg/l		µg/l		µg/l		µg/l	
Aluminum			21.	U	21.4		22.3		21.	U	36.8	
Antimony	6.	15.	3.	U	3.	U	3.	U	3.	U	3.9	
Arsenic	50.	11.	2.	U	2.3		2.	U	2.	U	3.1	
Barium	2000.	2600.	1.	U	42.1		47.7		64.9		42.	
Beryllium	4.	180.	1.	U	1.	U	1.	U	1.	U	1.	U
Cadmium	5.	18.	1.	U	1.7		1.5		1.	U	2.1	
Calcium			116.		38400.		34900.		26900.		40200.	
Chromium	100.		1.4	UJ	1.6	UJ	1.6	UJ	1.7	UJ	1.6	UJ
Cobalt			1.	U	1.	U	1.	U	1.	U	1.	U
Copper	1300.		2.	U	17.3		12.4		4.		21.4	
Iron	300.		36.3		16.		14.4		11.	U	58.2	
Lead	15.		1.	U	1.	U	1.4		1.	U	2.8	
Magnesium			51.	U	10200.		8740.		5800.		11400.	
Manganese	(SMCL) 50	180.	1.5		19.4		13.2		2.1		27.5	
Mercury	2.	11.	0.2	UJ	0.2	UJ	0.2	UJ	0.2	UJ	0.2	UJ
Nickel	100.	730.	2.2	UJ	1.9	UJ	1.5	UJ	1.6	UJ	2.4	UJ
Potassium			1730.	U	2750.	UJ	2410.	UJ	2650.	UJ	3830.	UJ
Selenium	50.	180.	3.	UJ	3.	UJ	3.	UJ	3.	UJ	3.	UJ
Silver		180.	1.	U	1.	U	1.	U	1.	U	1.	U
Sodium			295.	U	12000.		12400.		11700.		12800.	
Thallium	2.		4.8		5.5		4.	U	6.		4.1	
Vanadium		260.	1.	U	1.	U	1.	U	1.	U	1.	U
Zinc		11000.	4.8	UJ	210.		176.		61.9		266.	

SMCL-Secondary max. contam. level U - Undetected; method limit

J - Pos. result, estimated UJ - Undetected; estimated limit

Table 4
JONES and PARDEE SMELTER
Sediment Sampling Total Metals Results
November 7, 1995

SAMPLE NO.	Salt Lake Area	SCDM	JP-SE-02	JP-SE-03	JP-SE-04	JP-SE-05
LOCATION DESCRIPTION	Inorganic Background Soil	Soil Reference Dose Screen Concentration	Drainage from Upper East End Flat Area	Camp Drainage at L. Cottonwood Creek	Wasatch Resort, Penstock Diversion	White Pine Slide Narrows Above Tanner CG **Background**
Date/Time			11-7-95, 11:40	11-7-95, 13:30	11-7-95, 16:45	11-8-95, 14:00
ANALYTE	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Aluminum	9749.		3600.	4680.	1580.	4330. J
Antimony	10.3	31.	8. J	22.3 J	0.9 J	11.4
Arsenic	14.9	0.43*	107. J	192. J	4.9 J	42.6 J
Barium	178.3	5500.	55.2	118.	42.2	67.3
Beryllium	0.78	0.15*	0.5	0.4	0.3 U	0.7
Cadmium	1.46	39.	11.2	14.1	0.7	3.
Calcium	64302.4		27500.	22700.	10300.	29800.
Chromium	15.7		19. J	15.6 J	11.7 J	12.
Cobalt	6.3		6.3	5.7	2.2	5.1
Copper	50.5		249. J	359. J	32.3 J	150.
Iron	21527.9		15200.	16900.	5880.	9330.
Lead	127.5		1250.	7000.	38.3	261. J
Magnesium	10493.5		13500.	12900.	3590.	14300. J
Manganese	353.2	390.	760.	506.	194.	612.
Mercury	0.18	23.	0.2	3.	0.1 U	0.1 UJ
Nickel	13.	1600.	7.4	5.9	3.3	6.6
Potassium	3155.3		1450.	1990.	1080.	906.
Selenium	0.42	390.	1.3	2.3	0.8	0.8 U
Silver	1.84	390.	3.4	41.5	0.3 U	2.8
Sodium	1067.4		221.	1580.	93.1	270.
Thallium	0.38		1. U	1.4	1. U	1.1 U
Vanadium	21.7	550.	34.8 J	21.1 J	9.3 J	15.9
Zinc	206.1	23000.	1650.	11600.	123.	1370. J

* Cancer Risk Screen Conc.

J - Positive Result, estimated

U - Undetected; limit

UJ - Undetected, estimated result

APPENDIX A

SITE INSPECTION DATA SUMMARY

SITE INSPECTION DATA SUMMARY

Site Name: Jones & Pardee Smelter EPA Region: VIII Date: 9/11/96

State Office or Contractor Name and Address: Utah Dept. of Environmental Quality, Div. of Environmental Response and Remediation, 168 N 1950 West, Salt Lake City, Utah 84116.

GENERAL SITE INFORMATION

1. **CERCLIS ID Number:** UTD988075263

   Address: Little Cottonwood Canyon City: Salt Lake City

   County: Salt Lake State: UT Zip Code: 84092 Cong. Dist.: 2

2. **Owner Name:** USDA National Forest Service

   Owner Address: Regional Office 324 25th St. City: Ogden State: UT

   Operator Name: N/A

   Operator Address: _____ City: _____ State: _

3. **Type of Ownership** (check all that apply):

   ___ Private ___ Municipal ___ County ___ State

   X Federal/Agency Name: USDA Forest Service ___ Other: _____

   References: 1

4. **Approximate size of Property:** 20+ acres. References: 1

5. **Latitude:** 40° 34 23"

   Longitude: 111° 41° 45 " References: 2

6. **Status:** ___ Active X Inactive ___ Unknown References: 1

7. **Years of Operation:** From: 1871 To: 1973 References: 1

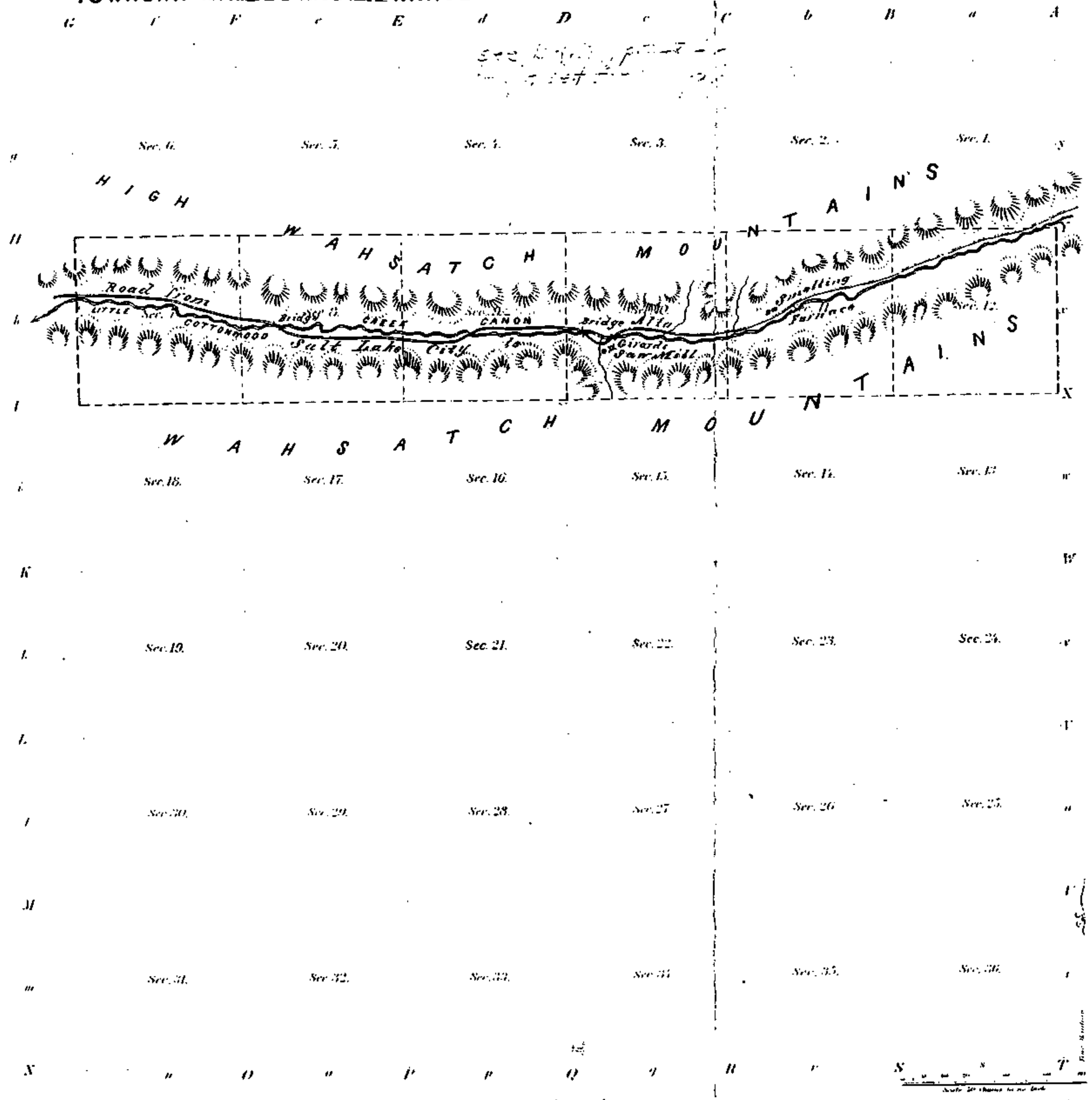
8. **Previous Investigations:**

TYPE	AGENCY/STATE/CONTRACTOR	DATE	
PA	Utah DEQ-DERR	3/93	References: 1
Work Plan	Utah DEQ/DERR	10/95	References: 1
ARR	Utah DEQ-DERR	9/96	References: 1
			References:
			References:
			References:
			References:
			References:
			References:

APPENDIX B

DETAIL OF EARLY BLM SURVEY MAP - 1871

TOWNSHIP No. *3 South* RANGE No. *2 East* *Salt Lake* MERIDIAN



Meanders of LITTLE CO[TTONWOOD]
Meanders of the right bank of Little Cottonwood Creek in Sec. 7
S. 37 E. 8.50
S. 69½ E. 3.57
S. 59 E. 6.50
S. 83 E. 11.45
S. 79 E. 11.25
N. 62 E. 3.00
S. 87 E. 1.00
S. 65½ E. 2.90
S. 82½ E. 4.80
N. 32½ E. 2.34
N. 80½ E. 2.15
S. 60½ E. 1.00
N. 78½ E. 1.70
S. 72½ E. 4.74
N. 83½ E. 9.00
S. 71½ E. 1.24
East 1.39
S. 80 E. 1.52
N. 66 E. 4.50
Thence in Sec. 8 on left bank of Stream
South 1.30
East 0.81
S. 83½ E. 3.32
N. 55½ E. 1.60
S. 78½ E. 3.00
N. 73½ E. 3.20
S. 82½ E. 2.00
S. 59½ E. 3.40
S. 82½ E. 2.70
N. 84 E. 3.00
S. 56 E. 3.10
N. 81½ E. 2.00
S. 83½ E. 4.32
S. 41 E. 2.00
East 1.86
N. 77½ E. 7.00
N. 41 E. 2.26
N. 76 E. 2.50
N. 64 E. 3.69
N. 65 E. 2.00
S. 78 E. 3.00
S. 68½ E. 3.00
S. 43 E. 4.04
S. 39 E. 1.00
S. 41½ E. 3.60
S. 79½ E. 3.00
S. 81 E. 2.50
N. 53½ E. 3.00
N. 50½ E. 1.00
N. 60½ E. 2.00
N. 79½ E. 3.12
N. 25 E. 2.90
N. 79 E. 2.00
S. 51 E. 1.00
S. 79½ E. 1.50

Scale 20 chains to an inch

Total number of Acres

Surveys Designated	By Whom Surveyed	Date of Contract	Amount of Surveys	When Surveyed
Township lines Meanders Subdivisions	Ferdinand Dickert	July 10th 1871	6 51 71	July 13 to 18th 1871

The above Map of Township No. **3 South** of Range No. **2 East** **Salt Lake** Meridian **Utah Territory** is strictly conformable to the [illegible]

[illegible]

Surveyor General's Office
Salt Lake City, Utah
August 5th 1871

[illegible signature]

APPENDIX C

FIELD ACTIVITIES REPORT

Attachment A - Photographic Log of Site Sampling
Attachment B - Consent for Access Form

PHOTOGRAPHIC LOG
Jones & Pardee Smelter, UTD988075263, Salt Lake County, Utah

View NE. Collecting JP-SS-01. 11/7/95

View N. Collecting JP-SO-02.

PHOTOGRAPHIC LOG
Jones & Pardee Smelter, UTD988075263, Salt Lake County, Utah

View NW. Collecting JP-SO-03. Campground Amphitheater. 11/7/95.

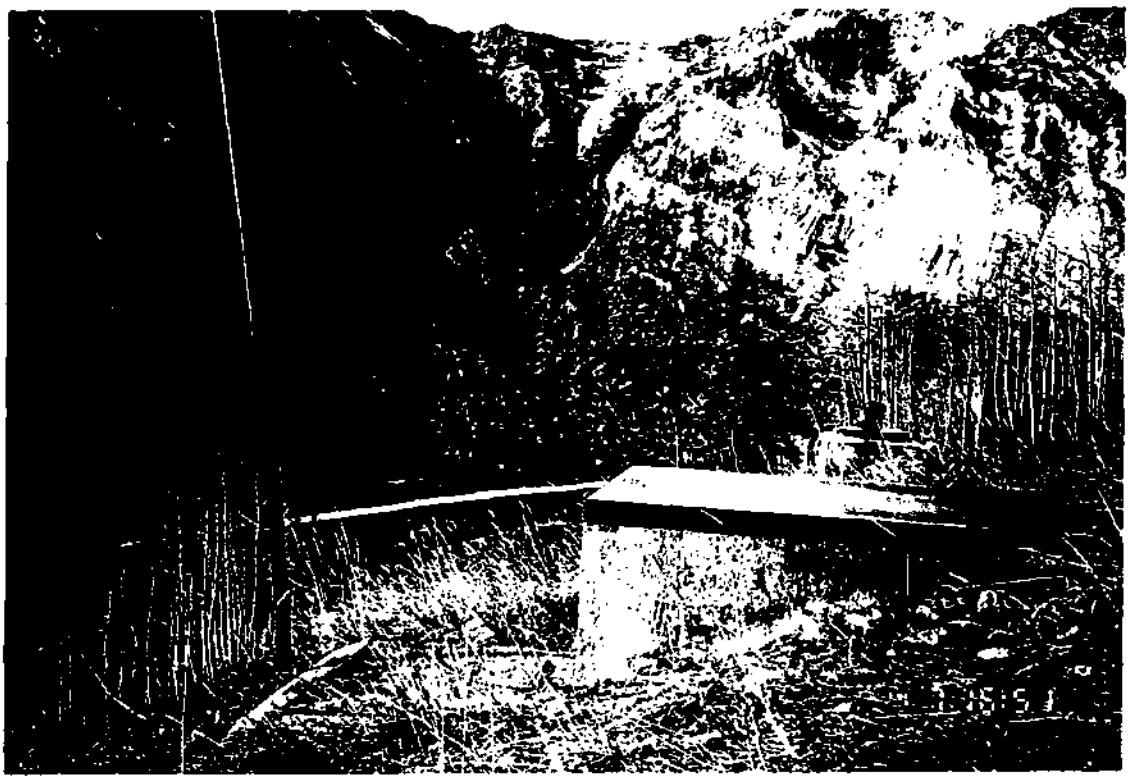
View N. Collecting JP-GW-01, 04 (Dup) from Tanner Flat Water Supply.

PHOTOGRAPHIC LOG
Jones & Pardee Smelter, UTD988075263, Salt Lake County, Utah

View N. Collecting JP-SO-04. Campground expansion area. 11/7/95

View W. Collecting JP-SO-05. Background sample from slope above (north) Campground.

PHOTOGRAPHIC LOG
Jones & Pardee Smelter, UTD988075263, Salt Lake County, Utah



View N. Collection site of JP-GW-02, Peruvian Drain Tunnel Collection Box. 11/7/95

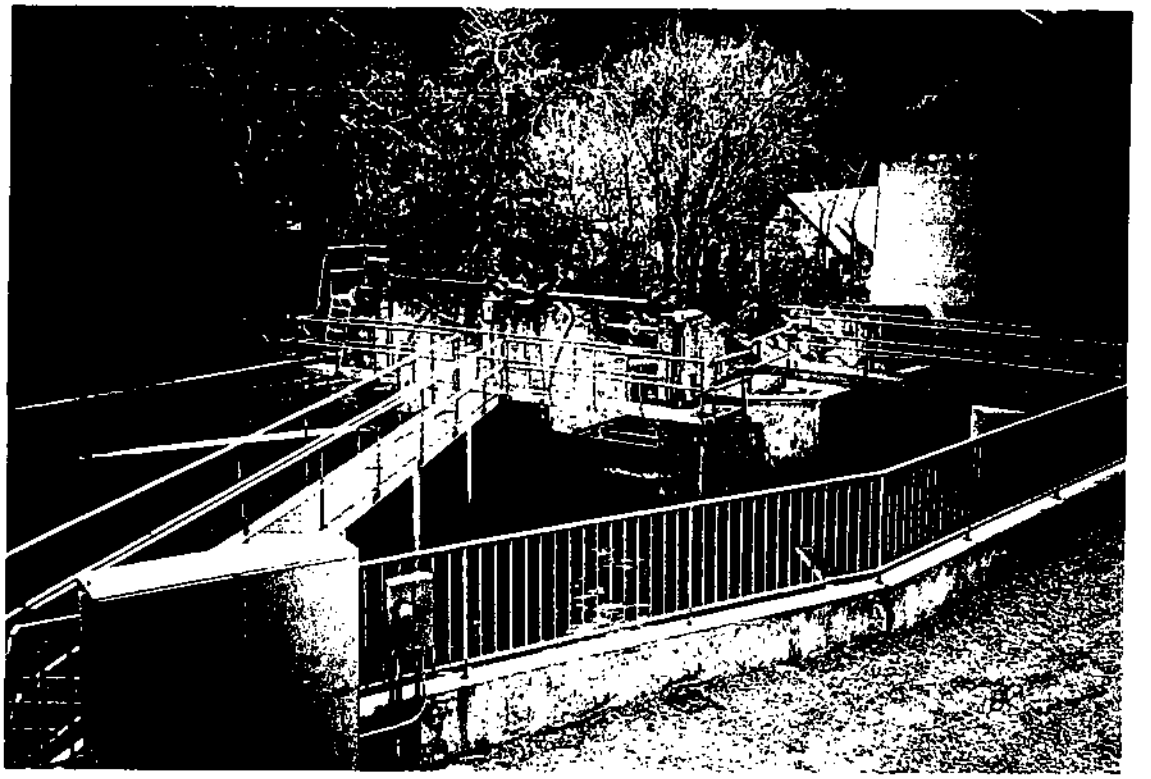
View E. Collection of JP-GW-03 from Wasatch Drain Tunnel, behind doors.

PHOTOGRAPHIC LOG
Jones & Pardee Smelter, UTD988075263, Salt Lake County, Utah

View S. Collecting JP-SE-02 L. Cottonwood Cr. near upper flat. 11/7/95

View E. Collecting JP-SE-03, Tanner Flat drainage confluence with L. Cottonwood Cr.

PHOTOGRAPHIC LOG
Jones & Pardee Smelter, UTD988075263, Salt Lake County, Utah



View SW. Murray Penstock Diversion on L. Cottonwood Cr. at Wasatch Resort.

APPENDIX D

LABORATORY DATA SHEETS

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VIII
999 18th STREET - SUITE 500
DENVER, COLORADO 80202-2466

Ref: 8ES-MEB

January 1, 1996

MEMORANDUM

SUBJECT: Data validation for Jones and Pardee, Case #24187, SDG # MHAJ31

FROM: Russ Leclerc RL 1/2/96
Chemist
Program Support Group, Technical Support Team

TO: Luke Chavez
8HWM-SM

The Environmental Services Assistance Team (ESAT) has completed its review of data from the analysis of nine water samples and nine soil samples for Contract Laboratory Program (CLP), Routine Analytical Services (RAS) total metals analyses for **Jones and Pardee, Case 23187**, Sample Delivery Group (SDG) **#MHAJ31**. I have evaluated ESAT's data validation package and agree with ESAT's review. Data in the enclosed package are acceptable with the qualifiers added to the data reports. Please refer to the attached ICF Kaiser data validation report including the narrative summary and comments for a full explanation of the data review findings.

If you have any questions,or if I can be of further assistance, please contact me at 312-6971.

Attachments

DATA QUALITY STATEMENT*

( ) Data are ACCEPTABLE according to the Functional Guidelines with no qualifiers (flags) by the reviewer

(X) Data are acceptable with QUALIFICATIONS noted in review

( ) Data are UNACCEPTABLE according to the Functional Guidelines

Telephone/Communication Logs Enclosed? Yes ___ No _X_

TPO Attention Required? Yes _X_ No ___

If yes, list the items that require attention: Prep blanks were not reported with the correct ICB and CCBs -- see Form 3 - BLANKS. There is no blank form for the TJA61 run for potassium only -- see Form 3 - BLANKS. The results for the aqueous mercury matrix spike analysis and the duplicate analysis were switched in the raw data and manually corrected by the laboratory. However, the results were incorrectly entered on FORM 5A and FORM 6. ESAT corrected FORM 5A and FORM 6 to reflect the changes that the laboratory had made to the raw data.

* Please see Data Qualifier Definitions, attached to the end of this report.

INORGANIC DATA QUALITY ASSURANCE REVIEW

REVIEW NARRATIVE SUMMARY

This data package was reviewed according to the EPA document "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," February 1994. The data package, Case 24187, SDG MHAJ31 consisted of nine water samples and nine soil samples for CLP RAS total metals analyses.

The following table lists the data qualifiers added to sample analyses.

SAMPLE ID	MATRIX	ELEMENTS - QUALIFIERS	PROBLEM	REVIEW SECTION
MHAJ39, MHAJ40, MHAJ42, MHAJ43, MHAJ44, MHAJ45, MHAJ46, MHAJ47, MHAJ48	Water	Chromium - UJ	Blank Contamination	FORM 3
MHAJ39, MHAJ40, MHAJ42, MHAJ45, MHAJ46, MHAJ47, MHAJ48	Water	Nickel - UJ	Blank Contamination	FORM 3
MHAJ39, MHAJ40, MHAJ42, MHAJ43, MHAJ44, MHAJ45, MHAJ46, MHAJ47	Water	Potassium - UJ	Blank Contamination	FORM 3
MHAJ48	Water	Zinc - UJ	Blank Contamination	FORM 3
MHAJ31, MHAJ32, MHAJ35	Soil	Silver - J	Negative Blank Contamination	FORM 3
MHAJ39, MHAJ40, MHAJ42, MHAJ43, MHAJ44, MHAJ45, MHAJ46, MHAJ47, MHAJ48	Water	Mercury - UJ	Matrix Spike	FORM 5A
MHAJ39, MHAJ40, MHAJ42, MHAJ43, MHAJ44, MHAJ45, MHAJ46, MHAJ47, MHAJ48	Water	Selenium - UJ	Matrix Spike	FORM 5A
MHAJ31, MHAJ32, MHAJ33, MHAJ34, MHAJ35, MHAJ36, MHAJ37, MHAJ38	Soil	Antimony - J	Matrix Spike	FORM 5A

MHAJ31, MHAJ32, MHAJ33, MHAJ34, MHAJ35, MHAJ36, MHAJ37, MHAJ38	Soil	Arsenic - J	Matrix Spike	FORM 5A
MHAJ31, MHAJ32, MHAJ33, MHAJ34, MHAJ35, MHAJ36, MHAJ37, MHAJ38	Soil	Copper - J	Matrix Spike	FORM 5A
MHAJ31, MHAJ32, MHAJ33, MHAJ34, MHAJ35, MHAJ36, MHAJ37, MHAJ38	Soil	Vanadium - J	Matrix Spike	FORM 5A
* MHAJ41	Soil	Arsenic - J	Matrix Spike	FORM 5A
MHAJ31, MHAJ32, MHAJ33, MHAJ34, MHAJ35, MHAJ36, MHAJ37, MHAJ38	Soil	Chromium - J	Duplicate	FORM 6
MHAJ31, MHAJ32, MHAJ33, MHAJ34, MHAJ35, MHAJ36, MHAJ37, MHAJ38	Soil	Copper - J	Duplicate	FORM 6
* MHAJ41	Soil	Aluminum, Lead, Magnesium, Mercury, Zinc - UJ or J	Duplicate	FORM 6

* Sample MHAJ41 was prepped and analyzed separately from the rest of the soils in this SDG and was therefore validated using separate QC samples.

INORGANIC DATA QUALITY ASSURANCE REVIEW

SOW ILM04.0

RAS INORGANIC DELIVERABLES COMPLETENESS CHECKLIST

P Inorganic Cover Page
P Inorganic Analysis Data Sheets (Form I)
P Initial Calibration and Calibration Verification Results (Form II)
P Continuing Calibration Verification Results (Form II)
P CRDL Standard for ICP & AA (Form II, Part 2)
P&NP Blank Analysis Results (Form III)
P ICP Interference Check Sample Results (Form IV)
P Spiked Sample Results (Form V)
P Post-digest Spiked Sample Analysis (Form V, Part 2)
P Duplicate Sample Results (Form VI)
P Instrument Detection Limits (Form X - Quarterly)
P Laboratory Control Sample results (Form VII)
NA Standard Addition Results (Form VIII)
P ICP Serial Dilution Results (Form IX)
P ICP Interelement Correction Factors (Form XII - Quarterly, or Form XI - Annually)
P ICP Linear Ranges (Form XII - Quarterly)
P Raw Data
P Samples P Calibration Standards P Blanks P Spikes
P Duplicates P ICP QC (ICS and Serial Dilution) P LCS
NA Furnace AA P Mercury Analysis NA Cyanide Analysis
P Percent Solids Calculations - Solids Only
P Sample Prep/Digestion Logs (Form XIII)
P Analysis Run Log (Form XIV)
P Traffic Report(s)
P Chain of Custody
P Sample Description
P Case Narrative
P Method References

KEY: P = Provided in original data package, as required by contract
R = Provided as Resubmission
NP = Not provided in original data package or as resubmission
NR = Not required under contract
NA = Not applicable to this data package

Comments: None

INORGANIC DATA QUALITY ASSURANCE REVIEW

HOLDING TIMES

All CLP-SOW holding times were met.

Yes _X_ No ___

All technical holding times were met.

Yes _X_ No ___

Comments: None

INSTRUMENT CALIBRATION: STANDARDS AND BLANKS

Initial instrument calibrations were performed according to contract requirements.

Yes _X_ No ___

Comments: None

The instruments were calibrated daily and each time an analysis run was performed.

Yes _X_ No ___

Comments: None

The instruments were calibrated using one blank and the appropriate number of standards.

Yes _X_ No ___

Comments: None

FORM 1 - SAMPLE ANALYSIS RESULTS

Sample analyses were entered correctly on the Form I's.

Yes _X_ No ___

Comments: None

INORGANIC DATA QUALITY ASSURANCE REVIEW

FORM 2A - INITIAL AND CONTINUING CALIBRATION VERIFICATION

The initial and continuing calibration verification standards (ICV and CCV, respectively) met contract requirements.

Yes _X_ No ___

Comments: None

The calibration verification results were within 90-110% recovery for metals, 80-120% for mercury, and 85-115% for cyanide.

Yes _X_ No ___

Comments: None

The continuing calibration standards were run at 10% frequency.

Yes _X_ No ___

Comments: None

FORM 2B - CRDL STANDARD FOR ICP AND AA

ICP Analysis: Standards (CRI) at 2X the CRDL or the IDL whichever were greater, were analyzed at the beginning and the end of each sample run, or at a minimum of twice per eight hour shift, whichever was more frequent.

Yes _X_ No ___

Comments: None

GFAA and/or CVAA Analysis: Standards (CRA) at the CRDL were analyzed at the beginning of each sample run.

Yes _X_ No ___ N/A ___

Comments: None

The CRI and/or the CRA were analyzed after the ICV.

Yes _X_ No ___ N/A __

Comments: None

The CRI and/or CRA results were within ±50% of the expected value for all elements except mercury.

Yes X No ___ N/A __

Comments: None

FORM 3 - BLANKS

The initial and continuing calibration blanks (ICB and CCB, respectively) met contract requirements.

Yes X No ___

Comments: None

The continuing calibration blanks were run at 10% frequency.

Yes X No ___

Comments: None

A laboratory/preparation blank was run at the frequency of one per twenty samples, or per sample delivery group (whichever is more frequent), and for each matrix analyzed.

Yes X No ___

Comments: None

All analyzed blanks were free of contamination.

Yes ___ No X

Comments: The following table lists the blanks with contamination, elements present, affected samples, and data qualifiers:

TYPE OF BLANK	SAMPLE MATRIX	ELEMENTS PRESENT; CONCENTRATION	SAMPLES AFFECTED - DATA QUALIFIERS
Prep Blank	Water	Chromium; 1.16 ug/L	MHAJ39, MHAJ40, MHAJ42, MHAJ43, MHAJ44, MHAJ45, MHAJ46, MHAJ47, MHAJ48 - UJ
Prep Blank	Water	Nickel; 1.04 ug/L	MHAJ39, MHAJ40, MHAJ42, MHAJ45, MHAJ46, MHAJ47, MHAJ48 - UJ
CCB1	Water	Potassium; 1731.9 ug/L	MHAJ39, MHAJ40, MHAJ42, MHAJ43, MHAJ44 - UJ

TYPE OF BLANK	SAMPLE MATRIX	ELEMENTS PRESENT; CONCENTRATION	SAMPLES AFFECTED - DATA QUALIFIERS
CCB2	Water	Potassium; 1108.4 ug/L	MHAJ45, MHAJ46, MHAJ47 - UJ
Prep Blank	Water	Zinc; 1.07 ug/L	MHAJ48 - UJ
Prep Blank	Soil	Silver; -1.13 ug/L	MHAJ31, MHAJ32, MHAJ35 - J
CCB3	Soil	Silver; -1.62 ug/L	MHAJ35 - J

Comments: The prep blanks were not reported with the correct ICB/CCBs. There is no blank form for the TJA61 run for potassium only.

FORM 4 - ICP INTERFERENCE CHECK SAMPLE

The ICP interference check sample (ICS) was run twice per eight hour shift and/or at the beginning and end of each sample set analysis sequence (whichever is more frequent).

Yes X No ___

Comments: None

Percent recovery of the analytes in solution ICSAB were within the range of 80-120%.

Yes X No ___

Comments: None

The ICSA and ICSAB contained no false positive or false negative results greater than the IDL.

Yes ___ No X

Comments: Minor amounts of antimony, arsenic, barium, copper, lead, manganese, nickel, potassium, thallium, vanadium, and zinc were present in the ICSA and ICSAB check samples. Sample results were low in concentration of potential interferences. No results were qualified.

INORGANIC DATA QUALITY ASSURANCE REVIEW

FORM 5A - MATRIX SPIKE SAMPLE ANALYSIS

A matrix spike sample was analyzed with every twenty or fewer samples of a similar matrix, or one per sample delivery group (whichever is more frequent).

Yes _X_ No ___

Comments: None

Spike recoveries were within the range of 75 - 125% (an exception is granted where the sample concentration is 4 times the spike concentration).

Yes ___ No _X_

Comments: The following table lists the spike recoveries outside control limits, matrix, samples affected, and data qualifiers:

ELEMENT	MATRIX	SPIKE RECOVERY	SAMPLES AFFECTED - QUALIFIERS
* Mercury	Water	63.4%	MHAJ39, MHAJ40, MHAJ42, MHAJ43, MHAJ44, MHAJ45, MHAJ46, MHAJ47, MHAJ48 - UJ
Selenium	Water	73.4%	MHAJ39, MHAJ40, MHAJ42, MHAJ43, MHAJ44, MHAJ45, MHAJ46, MHAJ47, MHAJ48 - UJ
Antimony	Soil	56.1%	MHAJ31, MHAJ32, MHAJ33, MHAJ34, MHAJ35, MHAJ36, MHAJ37, MHAJ38 - J
Arsenic	Soil	67.0%	MHAJ31, MHAJ32, MHAJ33, MHAJ34, MHAJ35, MHAJ36, MHAJ37, MHAJ38 - J
Copper	Soil	26.0%	MHAJ31, MHAJ32, MHAJ33, MHAJ34, MHAJ35, MHAJ36, MHAJ37, MHAJ38 - J
Vanadium	Soil	13.1%	MHAJ31, MHAJ32, MHAJ33, MHAJ34, MHAJ35, MHAJ36, MHAJ37, MHAJ38 - J
** Arsenic	Soil	13.0%	MHAJ41 - J

* The results for the aqueous mercury matrix spike analysis and the duplicate analysis were switched in the raw data and manually corrected by the laboratory. However, the results were incorrectly entered on FORM 5A and FORM 6. ESAT corrected FORM 5A and FORM 6 to reflect the changes that the laboratory had made to the raw data.

** Sample MHAJ41 was prepped and analyzed separately from the rest of the soils in this SDG and was therefore validated using separate QC samples.

FORM 5B - POST DIGEST SPIKE RECOVERY

A post-digest spike was performed for those elements that did not meet the specified criteria (exception: Ag, Hg).

Yes _X_ No ___ N/A ___

Comments: None

FORM 6 - DUPLICATE SAMPLE ANALYSIS

Duplicate sample analysis was performed with every twenty or fewer samples of a similar matrix, or one per sample delivery group (whichever is more frequent).

Yes _X_ No ___

Comments: None

The RPDs were calculated correctly.

Yes _X_ No ___

Comments: None

For sample concentrations >5 times the CRDL, RPDs were within ±20% (limits of ±35% apply for soil/sediments/tailings samples).

Yes ___ No _X_ N/A ___

Comments: The following table lists the duplicate analyses outside control limits, matrix, percent RPDs, samples affected, and data qualifiers:

ELEMENT	MATRIX	PERCENT RPD	SAMPLES AFFECTED - QUALIFIERS
Chromium	Soil	57.2%	MHAJ31, MHAJ32, MHAJ33, MHAJ34, MHAJ35, MHAJ36, MHAJ37, MHAJ38 - J
Copper	Soil	37.1%	MHAJ31, MHAJ32, MHAJ33, MHAJ34, MHAJ35, MHAJ36, MHAJ37, MHAJ38 - J
* Aluminum	Soil	39.8%	MHAJ41 - J
* Lead	Soil	52.5%	MHAJ41 - J
* Magnesium	Soil	38.7%	MHAJ41 - J
* Zinc	Soil	80.2%	MHAJ41 - J

* Sample MHAJ41 was prepped and analyzed separately from the rest of the soils in this SDG and was therefore validated using separate QC samples.

For sample concentrations <5 times the CRDL, duplicate analysis results were within the control window of ± CRDL (2X CRDL for soils).

Yes ___ No _X_

Comments: The following table lists the duplicate analysis outside control limits, matrix, CRDL, sample result, duplicate result, samples affected, and data qualifiers:

ELEMENT	MATRIX	2X CRDL	SAMPLE RESULT	DUPLICATE RESULT	SAMPLES AFFECTED - QUALIFIERS
* Mercury	Soil	0.4 mg/kg	0.14U mg/kg	0.92 mg/kg	MHAJ41 - UJ

* Sample MHAJ41 was prepped and analyzed separately from the rest of the soils in this SDG and was therefore validated using separate QC samples.

GFAA QC

No GFAA analyses were performed with this SDG.

INORGANIC DATA QUALITY ASSURANCE REVIEW

FORM 7 - LABORATORY CONTROL SAMPLE

The laboratory control sample (LCS) was prepared and analyzed with every twenty or fewer samples of a similar matrix, or one per sample delivery group (whichever is more frequent). An aqueous LCS is not required for mercury.

Yes _X_ No ___

Comments: None

All results were within the control limits.

Yes _X_ No ___

Comments: None

FORM 8 - STANDARD ADDITION RESULTS

Results from graphite furnace standard additions were correctly entered on Form I and Form VIII.

Yes ___ No ___ N/A _X_

Comments: None

FORM 9 - ICP QC

A serial dilution was performed for ICP analysis with every twenty or fewer samples of a similar matrix, or one per sample delivery group, whichever is more frequent.

Yes _X_ No ___

Comments: None

The serial dilution was without interference problems as defined by the functional guidelines.

Yes _X_ No ___

Comments: None

INORGANIC DATA QUALITY ASSURANCE REVIEW

FORM 10 - QUARTERLY INSTRUMENT DETECTION LIMITS (IDL)

IDL's were provided for all elements on the target analyte list.

Yes _X_ No ___

Comments: None

Reported IDL's met contract requirements.

Yes _X_ No ___

Comments: None

CYANIDE INSTRUMENT DETECTION LIMITS (IDL)

An IDL for cyanide was provided in the raw data.

Yes ___ No ___ N/A _X_

Comments: None

The reported cyanide IDL met contract requirements.

Yes ___ No ___ N/A _X_

Comments: None

FORM 11 - INTERELEMENT CORRECTION FACTORS FOR ICP

Interelement corrections for ICP were reported and met contract requirements.

Yes _X_ No ___

Comments: None

FORM 12 - ICP LINEAR RANGES

ICP linear ranges were reported and met contract requirements.

Yes _X_ No ___

Comments: None

INORGANIC DATA QUALITY ASSURANCE REVIEW

FORM 13 - PREPARATION LOG

Information on the preparation of samples for analysis was reported on Form XIII.

Yes _X_ No ___

Comment: None

FORM 14 - ANALYSIS RUN LOG

A Form XIV with the required information was filled out for each analysis run in the data package.

Yes _X_ No ___

Comments: None

Additional Comments or Problems/Resolutions (not addressed above): None

INORGANIC DATA QUALITY ASSURANCE REVIEW

REGION VIII

DATA QUALIFIER DEFINITIONS

For the purpose of Data Validation, the following code letters and associated definitions are provided for use by the data validator to summarize the data quality. Use of additional qualifiers should be carefully considered. Definitions for all qualifiers used should be provided with each report.

GENERAL QUALIFIERS for use with INORGANIC DATA

R - Reported value is "rejected". Resampling or reanalysis may be necessary to verify the presence or absence of the compound.

J - The associated numerical value is an estimated quantity because the Quality Control criteria were not met.

UJ - The reported amount is estimated because Quality Control criteria were not met. Element was not detected.

REGION VIII
RAS INORGANIC - SUMMARY OF CLP DATA QUALITY ASSURANCE REVIEW

CASE NO.	SITE NAME	SITE ID/OPERABLE UNIT
24187	Jones & Pardee	8ZZ/00

RPM NAME	ESAT TID - 08-9510-703
Helen Sadik-Macdonald	ESAT WUD - 36

LABORATORY	CONTRACT NO.	SDG	LABORATORY TPO/REGION
Southwest Laboratory of Oklahoma	68-D5-0137	MHAJ31	Ray Flores / VI

DATA REVIEWER Leslie K. Gergurich REVIEW COMPLETION DATE 12/27/95

SAMPLE ID	SAMPLE LOCATION	MATRIX	DATE COLLECTED
MHAJ31	JP-SS-01 Source	Soil	11/07/95
MHAJ32	JP-SO-02 Soil	Soil	11/07/95
MHAJ33	JP-SO-03	Soil	11/07/95
MHAJ34	JP-SO-04	Soil	11/07/95
MHAJ35	JP-SO-05	Soil	11/07/95
MHAJ36	JP-SE-02 Sediment	Soil	11/07/95
MHAJ37	JP-SE-03	Soil	11/07/95
MHAJ38	JP-SE-04	Soil	11/07/95
MHAJ39	JP-GW-02 Groundwater	Water	11/07/95
MHAJ40	JP-GW-03	Water	11/07/95
MHAJ41	JP-SE-05	Soil	11/08/95
MHAJ42	JP-SW-05 Surface	Water	11/08/95
MHAJ43	JP-GW-01	Water	11/08/95
MHAJ44	JP-GW-04	Water	11/08/95
MHAJ45	JP-SW-02	Water	11/08/95
MHAJ46	JP-SW-03	Water	11/08/95
MHAJ47	JP-SW-04	Water	11/08/95
MHAJ48	JP-SW-01	Water	11/08/95

Reviewed 1/2/96 RCL

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MHAJ31

Lab Name: SOUTHWEST_LAB_OF_OK Contract: 68-D5-0137
Lab Code: SWOK Case No.: 24187 SAS No.: SDG No.: MHAJ31
Matrix (soil/water): SOIL Lab Sample ID: 2401401
Level (low/med): MED Date Received: 11/09/95
% Solids: 96.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	11900			P	
7440-36-0	Antimony	3.3	B	N	P	J
7440-38-2	Arsenic	14.1		N	P	J
7440-39-3	Barium	164			P	
7440-41-7	Beryllium	1.7			P	
7440-43-9	Cadmium	0.49	B		P	
7440-70-2	Calcium	74300			P	
7440-47-3	Chromium	34.2		*	P	J
7440-48-4	Cobalt	3.9	B		P	
7440-50-8	Copper	152		N*	P	J
7439-89-6	Iron	16800			P	
7439-92-1	Lead	190			P	
7439-95-4	Magnesium	31900			P	
7439-96-5	Manganese	1160			P	
7439-97-6	Mercury	0.10	U		AV	
7440-02-0	Nickel	4.2	B		P	
7440-09-7	Potassium	3320			P	
7782-49-2	Selenium	1.1			P	
7440-22-4	Silver	0.39	B		P	
7440-23-5	Sodium	1270			P	
7440-28-0	Thallium	0.83	U		P	
7440-62-2	Vanadium	109		N	P	
7440-66-6	Zinc	136			P	
	Cyanide				NR	

Soil + Source

12/27/95

Color Before: GREY Clarity Before: Texture: COARSE
Color After: YELLOW Clarity After: Artifacts:

Comments:

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MHAJ32

Lab Name: SOUTHWEST_LAB_OF_OK Contract: 68-D5-0137
Lab Code: SWOK Case No.: 24187 SAS No.: SDG No.: MHAJ31
Matrix (soil/water): SOIL Lab Sample ID: 2401402
Level (low/med): MED Date Received: 11/09/95
% Solids: 88.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	7960			P	
7440-36-0	Antimony	2.8	B	N	P	J
7440-38-2	Arsenic	38.5		N	P	J
7440-39-3	Barium	105			P	
7440-41-7	Beryllium	0.48	B		P	
7440-43-9	Cadmium	2.6			P	
7440-70-2	Calcium	3310			P	
7440-47-3	Chromium	10.8		*	P	J
7440-48-4	Cobalt	7.5	B		P	
7440-50-8	Copper	46.4		N*	P	J
7439-89-6	Iron	16900			P	
7439-92-1	Lead	472			P	
7439-95-4	Magnesium	4890			P	
7439-96-5	Manganese	412			P	
7439-97-6	Mercury	0.18			AV	
7440-02-0	Nickel	11.2			P	
7440-09-7	Potassium	3010			P	
7782-49-2	Selenium	1.2			P	
7440-22-4	Silver	1.2	B		P	J
7440-23-5	Sodium	156	B		P	
7440-28-0	Thallium	1.1	B		P	
7440-62-2	Vanadium	21.3		N	P	J
7440-66-6	Zinc	186			P	
	Cyanide				NR	

12/27/95

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MHAJ33

Lab Name: SOUTHWEST_LAB_OF_OK Contract: 68-D5-0137
Lab Code: SWOK Case No.: 24187 SAS No.: SDG No.: MHAJ31
Matrix (soil/water): SOIL Lab Sample ID: 2401403
Level (low/med): MED Date Received: 11/09/95
% Solids: 95.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	4350			P	
7440-36-0	Antimony	147		N	P	J
7440-38-2	Arsenic	416		N	P	J
7440-39-3	Barium	48.8			P	
7440-41-7	Beryllium	0.28	B		P	
7440-43-9	Cadmium	52.6			P	
7440-70-2	Calcium	55800			P	
7440-47-3	Chromium	5.6		*	P	J
7440-48-4	Cobalt	4.0	B		P	
7440-50-8	Copper	1380		N*	P	J
7439-89-6	Iron	13200			P	
7439-92-1	Lead	8670			P	
7439-95-4	Magnesium	16300			P	
7439-96-5	Manganese	1100			P	
7439-97-6	Mercury	8.8			AV	
7440-02-0	Nickel	6.9	B		P	
7440-09-7	Potassium	1540			P	
7782-49-2	Selenium	2.6			P	
7440-22-4	Silver	82.8			P	
7440-23-5	Sodium	742	B		P	
7440-28-0	Thallium	1.4	B		P	
7440-62-2	Vanadium	13.9		N	P	J
7440-66-6	Zinc	17300			P	
	Cyanide				NR	

yes 12/27/95

Color Before: BROWN Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: Artifacts:

Comments:

U.S. EPA - CLP

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MHAJ34

Lab Name: SOUTHWEST_LAB_OF_OK Contract: 68-D5-0137
Lab Code: SWOK Case No.: 24187 SAS No.: SDG No.: MHAJ31
Matrix (soil/water): SOIL Lab Sample ID: 2401404
Level (low/med): MED Date Received: 11/09/95
% Solids: 92.3

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	5550			P	
7440-36-0	Antimony	86.0		N	P	J
7440-38-2	Arsenic	331		N	P	J
7440-39-3	Barium	121			P	
7440-41-7	Beryllium	0.36	B		P	
7440-43-9	Cadmium	21.7			P	
7440-70-2	Calcium	11500			P	
7440-47-3	Chromium	7.2		*	P	J
7440-48-4	Cobalt	6.1	B		P	
7440-50-8	Copper	997		N*	P	J
7439-89-6	Iron	15100			P	
7439-92-1	Lead	5030			P	
7439-95-4	Magnesium	7240			P	
7439-96-5	Manganese	1470			P	
7439-97-6	Mercury	14.8			AV	
7440-02-0	Nickel	9.5			P	
7440-09-7	Potassium	2460			P	
7782-49-2	Selenium	2.2			P	
7440-22-4	Silver	35.2			P	
7440-23-5	Sodium	548	B		P	
7440-28-0	Thallium	1.0	B		P	
7440-62-2	Vanadium	14.8		N	P	J
7440-66-6	Zinc	6970			P	
	Cyanide				NR	

12/27/95

Color Before: BLACK Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: Artifacts:

Comments:

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MHAJ35

Lab Name: SOUTHWEST_LAB_OF_OK Contract: 68-D5-0137
Lab Code: SWOK Case No.: 24187 SAS No.: SDG No.: MHAJ31
Matrix (soil/water): SOIL Lab Sample ID: 2401405
Level (low/med): MED Date Received: 11/09/95
% Solids: 56.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	9250			P	
7440-36-0	Antimony	4.6	B	N	P	J
7440-38-2	Arsenic	22.2		N	P	J
7440-39-3	Barium	304			P	
7440-41-7	Beryllium	0.63	B		P	
7440-43-9	Cadmium	5.5			P	
7440-70-2	Calcium	16300			P	
7440-47-3	Chromium	17.6		*	P	J
7440-48-4	Cobalt	7.3	B		P	
7440-50-8	Copper	146		N*	P	J
7439-89-6	Iron	15400			P	
7439-92-1	Lead	551			P	
7439-95-4	Magnesium	8320			P	
7439-96-5	Manganese	947			P	
7439-97-6	Mercury	0.20			AV	
7440-02-0	Nickel	10.6	B		P	
7440-09-7	Potassium	4240			P	
7782-49-2	Selenium	1.5	B		P	
7440-22-4	Silver	0.87	B		P	J
7440-23-5	Sodium	211	B		P	
7440-28-0	Thallium	1.4	U		P	
7440-62-2	Vanadium	29.5		N	P	J
7440-66-6	Zinc	361			P	
	Cyanide				NR	

gs 12/27/95

Color Before: GREY Clarity Before: Texture: MEDIUM
Color After: YELLOW Clarity After: Artifacts:

Comments:

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MHAJ36

Lab Name: SOUTHWEST_LAB_OF_OK Contract: 68-D5-0137
Lab Code: SWOK Case No.: 24187 SAS No.: SDG No.: MHAJ31
Matrix (soil/water): SOIL Lab Sample ID: 2401406
Level (low/med): MED Date Received: 11/09/95
% Solids: 80.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	3600			P	
7440-36-0	Antimony	8.0	B	N	P	J
7440-38-2	Arsenic	107		N	P	J
7440-39-3	Barium	55.2			P	
7440-41-7	Beryllium	0.49	B		P	
7440-43-9	Cadmium	11.2			P	
7440-70-2	Calcium	27500			P	
7440-47-3	Chromium	19.0		*	P	J
7440-48-4	Cobalt	6.3	B		P	
7440-50-8	Copper	249		N*	P	J
7439-89-6	Iron	15200			P	
7439-92-1	Lead	1250			P	
7439-95-4	Magnesium	13500			P	
7439-96-5	Manganese	760			P	
7439-97-6	Mercury	0.15			AV	
7440-02-0	Nickel	7.4	B		P	
7440-09-7	Potassium	1450			P	
7782-49-2	Selenium	1.3			P	
7440-22-4	Silver	3.4			P	
7440-23-5	Sodium	221	B		P	
7440-28-0	Thallium	0.99	U		P	
7440-62-2	Vanadium	34.8		N	P	J
7440-66-6	Zinc	1650			P	
	Cyanide				NR	

SE - SE

LS 12/27/95

Color Before: GREY Clarity Before: Texture: COARSE
Color After: YELLOW Clarity After: Artifacts:

Comments:

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MHAJ37

Lab Name: SOUTHWEST_LAB_OF_OK Contract: 68-D5-0137
Lab Code: SWOK Case No.: 24187 SAS No.: SDG No.: MHAJ31
Matrix (soil/water): SOIL Lab Sample ID: 2401407
Level (low/med): MED Date Received: 11/09/95
% Solids: 85.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	4680			P	
7440-36-0	Antimony	22.3		N	P	J
7440-38-2	Arsenic	192		N	P	J
7440-39-3	Barium	118			P	
7440-41-7	Beryllium	0.43	B		P	
7440-43-9	Cadmium	14.1			P	
7440-70-2	Calcium	22700			P	
7440-47-3	Chromium	15.6		*	P	J
7440-48-4	Cobalt	5.7	B		P	
7440-50-8	Copper	359		N*	P	J
7439-89-6	Iron	16900			P	
7439-92-1	Lead	7000			P	
7439-95-4	Magnesium	12900			P	
7439-96-5	Manganese	506			P	
7439-97-6	Mercury	3.0			AV	
7440-02-0	Nickel	5.9	B		P	
7440-09-7	Potassium	1990			P	
7782-49-2	Selenium	2.3			P	
7440-22-4	Silver	41.5			P	
7440-23-5	Sodium	1580			P	
7440-28-0	Thallium	1.4	B		P	
7440-62-2	Vanadium	21.1		N	P	J
7440-66-6	Zinc	11600			P	
	Cyanide				NR	

SE-03

12/27/95

Color Before: GREY Clarity Before: Texture: COARSE
Color After: YELLOW Clarity After: Artifacts:

Comments:

U.S. EPA - CLP

011

1

EPA SAMPLE NO.

INORGANIC ANALYSES DATA SHEET

MHAJ38

Lab Name: SOUTHWEST_LAB_OF_OK Contract: 68-D5-0137
Lab Code: SWOK Case No.: 24187 SAS No.: SDG No.: MHAJ31
Matrix (soil/water): SOIL Lab Sample ID: 2401408
Level (low/med): MED Date Received: 11/09/95
% Solids: 79.3

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	1580			P	
7440-36-0	Antimony	0.92	B	N	P	J
7440-38-2	Arsenic	4.9		N	P	J
7440-39-3	Barium	42.2	B		P	
7440-41-7	Beryllium	0.25	U		P	
7440-43-9	Cadmium	0.65	B		P	
7440-70-2	Calcium	10300			P	
7440-47-3	Chromium	11.7		*	P	J
7440-48-4	Cobalt	2.2	B		P	
7440-50-8	Copper	32.3		N*	P	J
7439-89-6	Iron	5880			P	
7439-92-1	Lead	38.3			P	
7439-95-4	Magnesium	3590			P	
7439-96-5	Manganese	194			P	
7439-97-6	Mercury	0.13	U		AV	
7440-02-0	Nickel	3.3	B		P	
7440-09-7	Potassium	1080	B		P	
7782-49-2	Selenium	0.80	B		P	
7440-22-4	Silver	0.25	U		P	
7440-23-5	Sodium	93.1	B		P	
7440-28-0	Thallium	1.0	U		P	
7440-62-2	Vanadium	9.3	B	N	P	J
7440-66-6	Zinc	123			P	
	Cyanide				NR	

SE-04

12/27/95

Color Before: GREY Clarity Before: Texture: COARSE
Color After: YELLOW Clarity After: Artifacts:

Comments:

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MHAJ39

Lab Name: SOUTHWEST_LAB_OF_OK Contract: 68-D5-0137
Lab Code: SWOK Case No.: 24187 SAS No.: SDG No.: MHAJ31
Matrix (soil/water): WATER Lab Sample ID: 2401409
Level (low/med): LOW Date Received: 11/09/95
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	48.7	B		P	
7440-36-0	Antimony	3.0	U		P	
7440-38-2	Arsenic	2.0	B		P	
7440-39-3	Barium	21.6	B		P	
7440-41-7	Beryllium	1.0	U		P	
7440-43-9	Cadmium	1.0	U		P	
7440-70-2	Calcium	35100			P	
7440-47-3	Chromium	1.8	B		P	UJ
7440-48-4	Cobalt	1.0	U		P	
7440-50-8	Copper	3.4	B		P	
7439-89-6	Iron	68.0	B		P	
7439-92-1	Lead	1.0	U		P	
7439-95-4	Magnesium	11200			P	
7439-96-5	Manganese	2.6	B		P	
7439-97-6	Mercury	0.20	U	N*	AV	UJ
7440-02-0	Nickel	1.2	B		P	UJ
7440-09-7	Potassium	2810	B		P	UJ
7782-49-2	Selenium	3.0	U	N	P	UJ
7440-22-4	Silver	1.0	U		P	
7440-23-5	Sodium	1600	B		P	
7440-28-0	Thallium	4.4	B		P	
7440-62-2	Vanadium	1.0	U		P	
7440-66-6	Zinc	28.0			P	
	Cyanide				NR	

GW-02

12/27/95

Color Before: COLORLESS Clarity Before: CLEAR Texture:
Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MHAJ40

Lab Name: SOUTHWEST_LAB_OF_OK Contract: 68-D5-0137
Lab Code: SWOK Case No.: 24187 SAS No.: SDG No.: MHAJ31
Matrix (soil/water): WATER Lab Sample ID: 2401410
Level (low/med): LOW Date Received: 11/09/95
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	47.7	B		P	
7440-36-0	Antimony	9.5	B		P	
7440-38-2	Arsenic	4.5	B		P	
7440-39-3	Barium	31.4	B		P	
7440-41-7	Beryllium	1.0	U		P	
7440-43-9	Cadmium	10.3			P	
7440-70-2	Calcium	48100			P	
7440-47-3	Chromium	1.6	B		P	UJ
7440-48-4	Cobalt	1.1	B		P	
7440-50-8	Copper	217			P	
7439-89-6	Iron	182			P	
7439-92-1	Lead	3.9			P	
7439-95-4	Magnesium	15200			P	
7439-96-5	Manganese	93.2			P	
7439-97-6	Mercury	0.20	U	N*	AV	UJ
7440-02-0	Nickel	5.1	B		P	UJ
7440-09-7	Potassium	2080	B		P	UJ
7782-49-2	Selenium	3.0	U	N	P	UJ
7440-22-4	Silver	1.0	U		P	
7440-23-5	Sodium	4450	B		P	
7440-28-0	Thallium	4.0	U		P	
7440-62-2	Vanadium	1.0	U		P	
7440-66-6	Zinc	1670			P	
	Cyanide				NR	

GW-03

12/27/95

Color Before: COLORLESS Clarity Before: CLEAR Texture:
Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MHAJ41

Lab Name: SOUTHWEST_LAB_OF_OK Contract: 68-D5-0137
Lab Code: SWOK Case No.: 24187 SAS No.: SDG No.: MHAJ31
Matrix (soil/water): SOIL Lab Sample ID: 2401411
Level (low/med): LOW Date Received: 11/09/95
% Solids: 71.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	4330		*	P	J
7440-36-0	Antimony	11.4	B		P	
7440-38-2	Arsenic	42.6		N	P	J
7440-39-3	Barium	67.3			P	
7440-41-7	Beryllium	0.65	B		P	
7440-43-9	Cadmium	3.0			P	
7440-70-2	Calcium	29800		*	P	
7440-47-3	Chromium	12.0		*	P	
7440-48-4	Cobalt	5.1	B		P	
7440-50-8	Copper	150			P	
7439-89-6	Iron	9330		*	P	
7439-92-1	Lead	261		*	P	J
7439-95-4	Magnesium	14300		*	P	J
7439-96-5	Manganese	612		*	P	
7439-97-6	Mercury	0.14	U	*	AV	UJ
7440-02-0	Nickel	6.6	B		P	
7440-09-7	Potassium	906	B		P	
7782-49-2	Selenium	0.84	U		P	
7440-22-4	Silver	2.8	B	*	P	
7440-23-5	Sodium	270	B		P	
7440-28-0	Thallium	1.1	U		P	
7440-62-2	Vanadium	15.9			P	
7440-66-6	Zinc	1370		*	P	J
	Cyanide				NR	

SE-05

gs 12/27/95

Color Before: GREY Clarity Before: Texture: COARSE
Color After: YELLOW Clarity After: Artifacts:

Comments:

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MHAJ42

Lab Name: SOUTHWEST_LAB_OF_OK Contract: 68-D5-0137

Lab Code: SWOK Case No.: 24187 SAS No.: SDG No.: MHAJ31

Matrix (soil/water): WATER Lab Sample ID: 2401412

Level (low/med): LOW Date Received: 11/09/95

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	36.8	B		P	
7440-36-0	Antimony	3.9	B		P	
7440-38-2	Arsenic	3.1	B		P	
7440-39-3	Barium	42.0	B		P	
7440-41-7	Beryllium	1.0	U		P	
7440-43-9	Cadmium	2.1	B		P	
7440-70-2	Calcium	40200			P	
7440-47-3	Chromium	1.6	B		P	UJ
7440-48-4	Cobalt	1.0	U		P	
7440-50-8	Copper	21.4	B		P	
7439-89-6	Iron	58.2	B		P	
7439-92-1	Lead	2.8	B		P	
7439-95-4	Magnesium	11400			P	
7439-96-5	Manganese	27.5			P	
7439-97-6	Mercury	0.20	U	N*	AV	UJ
7440-02-0	Nickel	2.4	B		P	UJ
7440-09-7	Potassium	3830	B		P	UJ
7782-49-2	Selenium	3.0	U	N	P	UJ
7440-22-4	Silver	1.0	U		P	
7440-23-5	Sodium	12800			P	
7440-28-0	Thallium	4.1	B		P	
7440-62-2	Vanadium	1.0	U		P	
7440-66-6	Zinc	266			P	
	Cyanide				NR	

SW-05

gg 12/27/95

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MHAJ43

Lab Name: SOUTHWEST_LAB_OF_OK Contract: 68-D5-0137
Lab Code: SWOK Case No.: 24187 SAS No.: SDG No.: MHAJ31
Matrix (soil/water): WATER Lab Sample ID: 2401413
Level (low/med): LOW Date Received: 11/09/95
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	21.0	U		P	
7440-36-0	Antimony	3.0	U		P	
7440-38-2	Arsenic	2.0	U		P	
7440-39-3	Barium	80.9	B		P	
7440-41-7	Beryllium	1.0	U		P	
7440-43-9	Cadmium	1.0	U		P	
7440-70-2	Calcium	33300			P	
7440-47-3	Chromium	1.0	B		P	UJ
7440-48-4	Cobalt	1.0	U		P	
7440-50-8	Copper	2.0	U		P	
7439-89-6	Iron	11.0	U		P	
7439-92-1	Lead	1.0	U		P	
7439-95-4	Magnesium	3000	B		P	
7439-96-5	Manganese	1.0	U		P	
7439-97-6	Mercury	0.20	U	N*	AV	UJ
7440-02-0	Nickel	1.0	U		P	
7440-09-7	Potassium	2150	B		P	UJ
7782-49-2	Selenium	3.0	U	N	P	UJ
7440-22-4	Silver	1.0	U		P	
7440-23-5	Sodium	4740	B		P	
7440-28-0	Thallium	4.0	U		P	
7440-62-2	Vanadium	1.0	U		P	
7440-66-6	Zinc	6.1	B		P	
	Cyanide				NR	

JP-GW-01

12/27/95

Color Before: COLORLESS Clarity Before: CLEAR Texture:
Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MHAJ44

Lab Name: SOUTHWEST_LAB_OF_OK_____ Contract: 68-D5-0137
Lab Code: SWOK__ Case No.: 24187 SAS No.: _____ SDG No.: MHAJ31
Matrix (soil/water): WATER Lab Sample ID: 2401414___
Level (low/med): LOW__ Date Received: 11/09/95
% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	21.0	U		P	
7440-36-0	Antimony	3.0	U		P	
7440-38-2	Arsenic	2.0	U		P	
7440-39-3	Barium	85.4	B		P	
7440-41-7	Beryllium	1.0	U		P	
7440-43-9	Cadmium	1.0	U		P	
7440-70-2	Calcium	35100			P	
7440-47-3	Chromium	1.6	B		P	UJ GW-04
7440-48-4	Cobalt	1.0	U		P	
7440-50-8	Copper	2.0	U		P	
7439-89-6	Iron	11.0	U		P	
7439-92-1	Lead	1.0	U		P	
7439-95-4	Magnesium	3130	B		P	
7439-96-5	Manganese	1.0	U		P	
7439-97-6	Mercury	0.20	U	N*	AV	UJ
7440-02-0	Nickel	1.0	U		P	
7440-09-7	Potassium	2930	B		P	UJ
7782-49-2	Selenium	3.0	U	N	P	UJ
7440-22-4	Silver	1.0	U		P	
7440-23-5	Sodium	5140			P	
7440-28-0	Thallium	4.0	U		P	
7440-62-2	Vanadium	1.0	U		P	
7440-66-6	Zinc	6.2	B		P	
	Cyanide				NR	

LG 12/27/95

Color Before: COLORLESS Clarity Before: CLEAR_ Texture: _____
Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MHAJ45

Lab Name: SOUTHWEST_LAB_OF_OK Contract: 68-D5-0137
Lab Code: SWOK Case No.: 24187 SAS No.: SDG No.: MHAJ31
Matrix (soil/water): WATER Lab Sample ID: 2401415
Level (low/med): LOW Date Received: 11/09/95
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	21.4	B		P	
7440-36-0	Antimony	3.0	U		P	
7440-38-2	Arsenic	2.3	B		P	
7440-39-3	Barium	42.1	B		P	
7440-41-7	Beryllium	1.0	U		P	
7440-43-9	Cadmium	1.7	B		P	
7440-70-2	Calcium	38400			P	
7440-47-3	Chromium	1.6	B		P	UJ
7440-48-4	Cobalt	1.0	U		P	
7440-50-8	Copper	17.3	B		P	SW-02
7439-89-6	Iron	16.0	B		P	
7439-92-1	Lead	1.0	U		P	
7439-95-4	Magnesium	10200			P	
7439-96-5	Manganese	19.4			P	
7439-97-6	Mercury	0.20	U	N*	AV	UJ
7440-02-0	Nickel	1.9	B		P	UJ
7440-09-7	Potassium	2750	B		P	UJ
7782-49-2	Selenium	3.0	U	N	P	UJ
7440-22-4	Silver	1.0	U		P	
7440-23-5	Sodium	12000			P	
7440-28-0	Thallium	5.5	B		P	
7440-62-2	Vanadium	1.0	U		P	
7440-66-6	Zinc	210			P	
	Cyanide				NR	

12/27/95

Color Before: COLORLESS Clarity Before: CLEAR Texture:
Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MHAJ46

Lab Name: SOUTHWEST_LAB_OF_OK_____ Contract: 68-D5-0137
Lab Code: SWOK__ Case No.: 24187 SAS No.: _____ SDG No.: MHAJ31
Matrix (soil/water): WATER Lab Sample ID: 2401416___
Level (low/med): LOW__ Date Received: 11/09/95
% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	22.3	B		P	
7440-36-0	Antimony	3.0	U		P	
7440-38-2	Arsenic	2.0	U		P	
7440-39-3	Barium	47.7	B		P	
7440-41-7	Beryllium	1.0	U		P	
7440-43-9	Cadmium	1.5	B		P	
7440-70-2	Calcium	34900			P	
7440-47-3	Chromium	1.6	B		P	UJ
7440-48-4	Cobalt	1.0	U		P	
7440-50-8	Copper	12.4	B		P	
7439-89-6	Iron	14.4	B		P	
7439-92-1	Lead	1.4	B		P	
7439-95-4	Magnesium	8740			P	
7439-96-5	Manganese	13.2	B		P	
7439-97-6	Mercury	0.20	U	N*	AV	UJ
7440-02-0	Nickel	1.5	B		P	UJ
7440-09-7	Potassium	2410	B		P	UJ
7782-49-2	Selenium	3.0	U	N	P	UJ
7440-22-4	Silver	1.0	U		P	
7440-23-5	Sodium	12400			P	
7440-28-0	Thallium	4.0	U		P	
7440-62-2	Vanadium	1.0	U		P	
7440-66-6	Zinc	176			P	
	Cyanide				NR	

SW-03

12/27/95

Color Before: COLORLESS Clarity Before: CLEAR Texture: _____
Color After: COLORLESS Clarity After: CLEAR Artifacts: _____

Comments:

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MHAJ47

Lab Name: SOUTHWEST_LAB_OF_OK_____ Contract: 68-D5-0137
Lab Code: SWOK__ Case No.: 24187 SAS No.: _____ SDG No.: MHAJ31
Matrix (soil/water): WATER Lab Sample ID: 2401417__
Level (low/med): LOW__ Date Received: 11/09/95
% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	21.0	U		P	
7440-36-0	Antimony	3.0	U		P	
7440-38-2	Arsenic	2.0	U		P	
7440-39-3	Barium	64.9	B		P	
7440-41-7	Beryllium	1.0	U		P	
7440-43-9	Cadmium	1.0	U		P	
7440-70-2	Calcium	26900			P	
7440-47-3	Chromium	1.7	B		P	UJ
7440-48-4	Cobalt	1.0	U		P	
7440-50-8	Copper	4.0	B		P	
7439-89-6	Iron	11.0	U		P	
7439-92-1	Lead	1.0	U		P	
7439-95-4	Magnesium	5800			P	
7439-96-5	Manganese	2.1	B		P	
7439-97-6	Mercury	0.20	U	N*	AV	UJ
7440-02-0	Nickel	1.6	B		P	UJ
7440-09-7	Potassium	2650	B		P	UJ
7782-49-2	Selenium	3.0	U	N	P	UJ
7440-22-4	Silver	1.0	U		P	
7440-23-5	Sodium	11700			P	
7440-28-0	Thallium	6.0	B		P	
7440-62-2	Vanadium	1.0	U		P	
7440-66-6	Zinc	61.9			P	
	Cyanide				NR	

SW.04

LG 12/27/95

Color Before: COLORLESS Clarity Before: CLEAR_ Texture: _____
Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MHAJ48

Lab Name: SOUTHWEST_LAB_OF_OK Contract: 68-D5-0137
Lab Code: SWOK Case No.: 24187 SAS No.: SDG No.: MHAJ31
Matrix (soil/water): WATER Lab Sample ID: 2401418
Level (low/med): LOW Date Received: 11/09/95
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	21.0	U		P	
7440-36-0	Antimony	3.0	U		P	
7440-38-2	Arsenic	2.0	U		P	
7440-39-3	Barium	1.0	U		P	
7440-41-7	Beryllium	1.0	U		P	
7440-43-9	Cadmium	1.0	U		P	
7440-70-2	Calcium	116	B		P	
7440-47-3	Chromium	1.4	B		P	UJ SW-01
7440-48-4	Cobalt	1.0	U		P	
7440-50-8	Copper	2.0	U		P	
7439-89-6	Iron	36.3	B		P	
7439-92-1	Lead	1.0	U		P	
7439-95-4	Magnesium	51.0	U		P	
7439-96-5	Manganese	1.5	B		P	
7439-97-6	Mercury	0.20	U	N*	AV	UJ
7440-02-0	Nickel	2.2	B		P	UJ
7440-09-7	Potassium	1730	U		P	
7782-49-2	Selenium	3.0	U	N	P	UJ
7440-22-4	Silver	1.0	U		P	
7440-23-5	Sodium	295	U		P	
7440-28-0	Thallium	4.8	B		P	
7440-62-2	Vanadium	1.0	U		P	
7440-66-6	Zinc	4.8	B		P	UJ
	Cyanide				NR	

12/27/95

Color Before: COLORLESS Clarity Before: CLEAR Texture:
Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VIII
999 18th STREET - SUITE 500
DENVER, COLORADO 80202-2466

TO: Liz Yeomans
COMPANY: UDEQ
CITY: Salt Lake City

PHONE: 801-536-4150
FAX NO: 801-536-4242
STATE: Utah

FROM: Carol Beard
OFFICE CODE: EPA RSCC 8ES
NUMBER OF PAGES TO FOLLOW:

PHONE: (303) 293-0991
FAX NO: (303) 294-1058
DATE: 11/06/95

Lab Assignment for Jones + Dardel

RAS # 24187
DCN 96-003

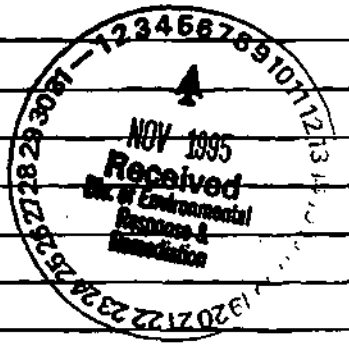
LAB (Inorganics): SWOK

Southwest Labs of Oklahoma
1700 West Albany, Ste. C
Broken Arrow, OK 74012

Lab Phone (918) 251-2858
Lab Fax (918) 251-2597

If you have any questions, please call.

Carol



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REGION 8 RSCC FORM I
CONTRACTOR:
CSCC:

Mail Code TMS-Q

Carol 303/312 6047)

DCN:
RAS No:
ULSA No: S8-
ESD Lab No: R8-

REQUEST FOR ROUTINE ANALYTICAL SERVICES AND/OR UNIQUE LABORATORY SAMPLE ANALYSES

SITE NAME: Jones & Pardee
SITE MANAGER (EPA/State): Helen Sadik-Macdonald
CITY, STATE: Salt Lake, UT
TELEPHONE NO: 801/536-4235
CERCLIS ID: UTD988075263
SHIPPING CONTACT: Same
SITE SPILL CODE:
TELEPHONE NO:
OPERABLE UNIT:
SAMPLING DATE(S): ASAP (before Snow) 11/8/95
ACTIVITY TYPE: Site Inspection
SHIPPING DATE(S): same day as Sampling
PROGRAM: Superfund
TURNAROUND TIME: 14-day

Routine Analytical Services

Inorganics

MATRIX	NO. OF SAMPLES/ANALYSES	CONCENTRATION	LAB QC SAMPLES
SOIL	TM 12 CN	(L) M H	TM CN
WATER	TM 10 DM CN	(L) M H	TM 4 DM CN

Organics

MATRIX	NO. OF SAMPLES/ANALYSES	CONCENTRATION	LAB QC SAMPLES
SOIL	VOA BNA PEST	L M H	VOA BNA PEST
WATER	VOA BNA PEST	L M H	VOA BNA PEST

Unique Laboratory Sample Analyses

(attach completed ULSA CRF)

MATRIX	ANALYSIS (method)	NO. OF SAMPLES (without QC)	CONCENTRATION	QC SAMPLES
			L M H	
			L M H	
			L M H	

Name and date Site Manager (EPA/State) approved SAP: Luke Chavez 10/2/95
10/2/95

Date RSCC received RAS and/or ULSA Request

Date RAS Request forwarded to CLASS:
Date ULSA Request forwarded to ESD Lab:
Date ULSA Request forwarded to Lab Communi

Post-it® Fax Note 7671 | Date | # of pages ▶
To Gina Gindleberger | From Helen Sadik Macdonald
Co./Dept. Qual Assurance | Co. UTAH DEQ
Phone # 312-6055 | Phone # 801/536-4235
Fax # 312-6339 | Fax # 536-4242

6363

INSTRUCTIONS FOR COMPLETING THE REGION 8 RSCC FORM I

1) In the upper left corner of the Region 8 RSCC Form I, fill in the name of the company responsible for this sampling event next to CONTRACTOR. The contact person at the contractor's location should be written in the space next to CSCC (Contractor Sample Control Coordinator).

2) The Document Control Number (DCN), RAS No., ULSA No., and ESD Lab No. blanks located in the upper right corner of the Region 8 RSCC Form I will be assigned by the RSCC and/or CLASS (Contract Laboratory Administrative Support Services).

3) Record the following information in their respective blanks on the Region 8 RSCC Form I:
SITE NAME: name of site to be sampled
CITY, STATE: city and state where the site is located
CERCLIS ID: identification number for the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS)
SITE SPILL CODE: "8" followed by two-digit spill code assigned to the site. If one has not yet been assigned, enter "ZZ".
OPERABLE UNIT: two-digit number for the particular section of the site to be sampled. Enter "N/A" if there is no applicable operable unit.
ACTIVITY TYPE: type of activity (i.e.; site investigation, remedial action, etc.)
PROGRAM: "State" or "Superfund"
SITE MANAGER (EPA/State): name of EPA Site Manager or State Site Manager responsible for receiving data package(s)
TELEPHONE NO: telephone number of EPA Site Manager or State Site Manager
SHIPPING CONTACT: name of person in charge of shipping samples
TELEPHONE NO: telephone number of person in charge of shipping samples
SAMPLING DATE(S): anticipated date(s) samples are to be taken
SHIPPING DATE(S): anticipated date(s) samples are to be shipped
TURNAROUND TIME: [calendar days] - for RAS, indicate either 14- or 35-day turnaround; for ULSA, specify a reasonable turnaround time to meet project goals.

4) Samples scheduled for RAS should be indicated in the respective inorganic or organic boxed areas. On the same line as the sample matrix, enter the number of samples to be taken in the space next to the analysis desired. For example, to have 15 water samples scheduled for volatile analysis, write "15" in the blank next to VOA. Circle the expected sample concentration (low, medium, or high). In the LAB QC SAMPLES column, indicate either the number of samples which will be taken and shipped to the laboratory for QC purposes (i.e.; MS/MSD for organics or spike/duplicate for inorganics). Refer to Chapter II of the "User's Guide to the Contract Laboratory Program" for the definition of laboratory QC samples.

5) For samples scheduled for ULSA, indicate the type of matrix (soil, water, sludge, oil, fish, etc.), type of analysis OR method number, number of samples without QC, sample concentration (low, medium, or high), and number of QC samples. A completed ULSA CRF (Client Request Form) will also need to be submitted with the Region 8 RSCC Form I.

6) An approved SAP (Sampling and Analysis Plan) for the scheduled sampling event should be confirmed prior to submitting the Region 8 RSCC Form I. Fill in the name of the EPA/State Site Manager and date the SAP was approved. The Region 8 RSCC Form I cannot be processed by the RSCC until a SAP has been approved.

7) Fax the Region 8 RSCC Form I and the ULSA CRF (if required) to the RSCC at (303) 294-1058 prior to the following deadlines:
RAS - 9:00 a.m. Wednesday of the week prior to sampling
ULSA - 4-6 weeks prior to sampling

If you have any questions, please contact the RSCC representative at (303) 293-0991.

EPA

United States Environmental Protection Agency
Contract Laboratory Program Sample Management Office
PO Box 818 Alexandria, VA 22313
703-557-2490 FTS 557-2490

Inorganic Traffic Report & Chain of Custody Record

(For Inorganic CLP Analysis)

SAS No. (if applicable):

Case No.:

1. Project Code	Account Code	2. Region No.	Sampling Co.	4. Date Shipped	Carrier
		VIII	Utah DEQ	11/8/95	Fed. Ex.

Regional Information: RAS# 24187

Sampler (Name): Helen L. Sadik-Macdonald

Airbill Number: 8097512710

Non-Superfund Program

Sampler Signature: Helen Sadik-Macdonald

Site Name: Jones & Pardee

City, State: SLC, UT

Site Spill ID: 08807526

3. Type of Activity

	Lead	Pre-Remedial	Remedial	Removal
SF			RIFS	CLEM
PRP		PA	RD	REMA
ST		SSI	RA	REM
FED		LSI	O&M	OIL
			NPLD	UST

5. Ship To: Southwest Labs of Oklahoma
1700 W. Albany, Ste-C
Broken Arrow, OK 74012
ATTN: Chuck Hoover

6. Preservative (Enter in Column D)
1. HCl
2. HNO3
3. NaOH
4. H_2SO_4
5. $K_2CR_2O_7$
6. Ice only
7. Other (Specify)
N. Not preserved

7. Sample Description (Enter in Column A)
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil/Sediment
6. Oil (High only)
7. Waste (High only)
8. Other (Specify)

CLP Sample Numbers (from labels)	A Enter # from Box 7	B Conc. Low Med High	C Sample Type: Comp/ Grab	D Preservative from Box 6	E - RAS Analysis: Metals Total	Metals Dissolved	Cyanide	Low Conc. only: Nitrate/ Nitrite	Low Conc. only: Fluoride	High only: pH	High only: Conductivity	F Regional Specific Tracking Number or Tag Numbers	G Station Location Number	H Mo/Day/ Year/Time Sample Collection	I Sampler Initials	J Corresp. CLP Org. Samp. No.	K Enter Appropriate Qualifier for Designated Field QC
MHAJ31	5	Med	Grab	6	✓							8-140462	JP-SS-01	11/7/95 11:00	HSM		
MHAJ32	5	Med	Grab	6	✓							8-140463	JP-SO-02	11/7/95 11:10	HSM		
MHAJ 33	5	Med	Grab	6	✓							8-140464	JP-SO-03	11/7/95 12:30	HSM		
MHAJ 34	5	Med	Grab	6	✓							8-140465	JP-SO-04	11/7/95 13:55	HSM		
MHAJ 35	5	Med	Grab	6	✓							8-140466	JP-SO-05	11/7/95 16:20	HSM		
MHAJ 36	5	Med	Grab	6	✓							8-140467	JP-SE-02	11/7/95 11:40	HSM		
MHAJ 37	5	Med	Grab	6	✓							8-140468	JP-SE-03	11/7/95 13:30	HSM		
MHAJ 38	5	Med	Grab	6	✓							8-140469	JP-SE-04	11/7/95 16:45	HSM		
MHAJ 39	2	Low	Grab	2	✓							8-140470	JP-GW-02	11/7/95 14:30	HSM		
MHAJ 40	2	Low	Grab	2	✓							8-140471	JP-GW-03	11/7/95 15:15	HSM		

Shipment for Case complete? (Y/N): Y

Page 1 of 2

Sample used for a spike and/or duplicate:

Additional Sampler Signatures:

Chain of Custody Seal Number:

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Helen Sadik-Macdonald	11/8/95 16:00				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks: Is custody seal intact? Y/N/none	

Split Samples ☐ Accepted (Signature)
☐ Declined

EPA Form 9110-1 (Rev. 5-91) Replaces EPA Form (2075-6), previous edition which may be used

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Inorg-1

341290

EPA

United States Environmental Protection Agency
Contract Laboratory Program Sample Management Office
PO Box 818 Alexandria, VA 22313
703-557-2490 FTS 557-2490

Inorganic Traffic Report & Chain of Custody Record

(For Inorganic CLP Analysis)

SAS No. (if applicable):

Case No.:

1. Project Code: | Account Code:

2. Region No.: VIII | Sampling Co.: UTah DEQ

4. Date Shipped: 11/8/95 | Carrier: Fed Ex,

Regional Information: RAS#24187

Sampler (Name): Helen L. Smith-Macdonald

Airbill Number: 8097512710

Non-Superfund Program

Sampler Signature: Helen Smith-Macdonald

5. Ship To: Southwest Labs of Oklahoma
1700 W. Albany, Ste-C
Broken Arrow, OK 74012
ATTN: Chuck Hoover

Site Name: Jones & Pardee

3. Type of Activity: Lead / Pre-Remedial: SF, PRP, ST, FED; PA, SSI, LSI | Remedial: RIFS, RD, RA, O&M, NPLD | Removal: CLEM, REMA, REM, OIL, UST

City, State: SLC, UT | Site Spill ID: 08807526 3

6. Preservative (Enter in Column D): 1. HCl 2. HNO3 3. NaOH 4. H_2SO_4 5. $K_2CR_2O_7$ 6. Ice only 7. Other (Specify) N. Not preserved

7. Sample Description (Enter in Column A): 1. Surface Water 2. Ground Water 3. Leachate 4. Rinsate 5. Soil/Sediment 6. Oil (High only) 7. Waste (High only) 8. Other (Specify)

CLP Sample Numbers (from labels)	A Enter # from Box 7	B Conc. Low Med High	C Sample Type: Comp./ Grab	D Preservative from Box 6	E - RAS Analysis: Metals Total	Metals Dissolved	Cyanide	Low Conc. only: Nitrate/ Nitrite	Fluoride	High only: pH	Conductivity	F Regional Specific Tracking Number or Tag Numbers	G Station Location Number	H Mo/Day/ Year/Time Sample Collection	I Sampler Initials	J Corresp. CLP Org. Samp. No.	K Enter Appropriate Qualifier for Designated Field QC (B = Blank S = Spike D = Duplicate PE = Perform. Eval. — = Not a QC Sample)
MHAJ41	5	Low	Grab	6	✓							8-140472	JP-SE-05	11/8/95 14:00	HSm		
MHAJ42	1	Low		2	1							8-140473	JP-SW-05	11/8/95 14:00	HSm		
MHAJ43	2	Low		2	1							8-140474	JP-GW-01	11/8/95 13:30	HSm		
MHAJ44	2	Low		2	✓							8-140475	JP-GW-04	11/8/95 13:40	HSm		
MHAJ45	1	Low		2	1							8-140476	JP-SW-02	11/8/95 13:15	HSm		
MHAJ46	1	Low		2	1							8-140478	JP-SW-03	11/8/95 12:45	HSm		
MHAJ47	1	Low		2	1							8-140479	JP-SW-04	11/8/95 12:30	HSm		
MHAJ48	1	Low	↓	2	1							8-140480	JP-SW-01	11/8/95 10:00	HSm		
MHAJ44	2	Low	Grab	2	1							8-140481	JP-GW-04	11/8/95 13:40	HSm		

Shipment for Case complete? (Y/N): Y

Page 2 of 2

Sample used for a spike and/or duplicate: MHAJ44

Additional Sampler Signatures:

Chain of Custody Seal Number:

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Helen Smith-Macdonald	11/8/95 16:00				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks: Is custody seal intact? Y/N/none	

Split Samples: ☐ Accepted (Signature) ☐ Declined

EPA Form 9110-1 (Rev. 5-91) Replaces EPA Form (2075-6), previous edition which may be used

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SEE REVERSE FOR ADDITIONAL STANDARD INSTRUCTIONS

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1 From (please print)

Date 11/8/94 Sender's FedEx Account Number 1828-8775-7

Sender's Name Helen Sadik-Macdonald Phone (801-536-4450

Company DEPT OF ENVIRONMENTAL QUALITY Dept/Floor Suite/Room First Floor / DERR

charge to 100 480 NAC 4610 MAI5/6 M039P SIM

Address 168 N 1950 WEST

City SALT LAKE CITY State UT Zip 8 4 1 1 6

2 Your Internal Billing Reference Information (Optional) (First 24 characters will appear on invoice) 4840

3 To (please print)

Recipient's Name Chuck Hoover Phone (918) 251-2858

Company Southwest Labs of Oklahoma Dept/Floor Suite/Room Suite C

Address (To "HOLD" at FedEx location, print FedEx address here) 1700 West Albany
(We Cannot Deliver to P.O. Boxes or P.O. Zip Codes)

City Broken Arrow State OK Zip 74012

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(Not available with FedEx First Overnight)

For Saturday Delivery check here

☐ (Extra Charge. Not available to all locations) (Not available with FedEx First Overnight or FedEx Standard Overnight)

4 Service*

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(For packages over 150 pounds. Call for delivery schedule.)

☐ NEW FedEx First Overnight (Earliest next business morning delivery to select locations) (Higher rates apply)

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5 Packaging

☐ FedEx Letter* ☐ FedEx Pak* ☐ FedEx Box ☐ FedEx Tube ☒ Other Packaging

*Declared value limit $500

6 Special Handling

Does this shipment contain dangerous goods? ☐ Yes (4b per adjusted Shipper's Declaration) ☐ Yes (Shipper's Declaration not required)

☐ Dry Ice Dry Ice, 9, UN 1845 [illegible] x [illegible] kg 904 (Dangerous Goods Shipper's Declaration not required) CA ☐ Cargo Aircraft Only

7 Payment

Bill to: ☒ Sender (Account no. in Section 1 will be billed) ☐ Recipient ☐ Third Party ☐ Credit Card ☐ Cash/Check
(Enter FedEx account no. or Credit Card no. below)

FedEx Account No. [illegible]

Credit Card No. [illegible] Exp. Date [illegible]

Total Packages	Total Weight	Total Declared Value*	Total Charges
1	03	$ 1500 .00	$

* When declaring a value higher than $100 per package, you pay an additional charge. See SERVICE CONDITIONS, DECLARED VALUE AND LIMIT OF LIABILITY section for further information.

8 Release Signature

Your signature authorizes Federal Express to deliver this shipment without obtaining a signature and agrees to indemnify and hold harmless Federal Express from any resulting claims.

232

Service Conditions, Declared Value, and Limit of Liability – By using this Airbill, you agree to the service conditions in our current Service Guide or U.S. Government Service Guide. Both are available on request. See back of Sender's Copy of this airbill for information and additional terms. We will not be responsible for any claim in excess of $100 per package whether the result of loss, damage, or delay, non-delivery, misdelivery, or misinformation, unless you declare a higher value, pay an additional charge, and document your actual loss in a timely manner. You right to recover from us for any loss includes intrinsic value of the package, loss of sales, interest, profit, attorney's fees, costs, and other forms of damage, whether direct, incidental, consequential, or special, and is limited to the greater of $100 or the declared value but cannot exceed actual documented loss. The maximum declared value for any FedEx Letter and FedEx Pak is $500. Federal Express may, upon your request, and with some limitations, refund all transportation charges paid

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APPENDIX E

RAW WATER ANALYTICAL RESULTS - MURRAY PENSTOCK

Salt Lake City Corporation Raw Water Analysis

1993 Stream Analysis

Little Cottonwood Creek at Murray City Water Intake

Date	1/28/93	2/24/93	3/25/93	4/28/93	5/26/93	6/30/73	7/28/93	9/1/93	9/30/93	10/27/93	12/1/93	12/28/93
Analyte	Jan-93	Feb-93	Mar-93	Apr-93	May-93	Jun-93	Jul-93	Aug-93	Sep-93	Oct-93	Nov-93	Dec-93
T. Sus. Solids mg/l	<3	<3	<3	<3	8.00	3.00	<3	<3	<3	<3	<3	<3
T.K.N. mg/l	<0.1	0.41	0.10	<0.1	0.10	<0.1	0.10	0.10	0.36	0.10	0.14	0.12
Ammonia as N, mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
D- Arsenic, ug/l	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
D-Barium, ug/l	70.00	71.00	73.00	85.00	33.00	24.00	26.00	39.00	62.00	66.00	61.00	66.00
D-Cadmium, ug/l	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
D-Calcium, ug/l	31.00	30.00	31.00	36.00	15.00	10.00	15.00	20.00	23.00	23.00	26.00	28.00
D-Chromium, ug/l	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
D-Copper, ug/l	<20	<20	<20	<20	<20	<30	<20	<30	<30	<20	<20	<20
D-Iron, ug/l	49.00	<20	<20	<30	<30	<30	<30	<30	<30	<20	<20	21.00
D-Lead, ug/l	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
D-Magnesium, mg/l	6.80	6.90	6.90	7.20	3.60	2.80	3.20	4.30	4.60	4.50	5.80	5.40
D-Manganese, ug/l	<20	<20	5.20	<10	<10	<10	<10	<10	<10	<10	<5	<5
D-Potassium, mg/l	1.10	1.20	1.30	1.30	<1	<1	<1	<1	1.20	1.20	1.20	1.10
D-Selenium, ug/l	<5	<5	<5	<2	<2	<2	<2	<1	<1	<1	<1	<1
D-Silver, ug/l	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
D-Sodium, mg/l	12.00	13.00	26.00	25.00	9.60	3.50	4.20	7.60	11.00	12.00	12.00	12.00
D-Zinc, ug/l	51.00	61.00	52.00	70.00	48.00	49.00	68.00	59.00	37.00	31.00	65.00	49.00
Bicarbonate, mg/l	80.00	79.00	70.00	78.00	44.00	41.00	45.00	58.00	66.00	66.00	78.00	74.00
Carbon dioxide, mg/l	3.00	4.00	3.00	2.00	2.00	5.00	2.00	1.00	4.00	4.00	4.00	7.00
Carbonate, mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chloride, mg/l	20.00	21.50	51.00	62.80	17.50	4.00	5.50	9.90	17.50	18.50	15.00	16.00
Hydroxide, mg/l	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sulfate, mg/l	40.50	40.52	34.31	27.57	11.56	10.31	11.07	18.59	19.72	19.99	33.04	22.71
T. Phosphorus, mg/l	<0.01	<0.02	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.19	<0.01	<0.01	<0.01
T.Alkalinity/CaCO3, mg/l	65.00	65.00	57.00	64.00	36.00	33.00	37.00	47.00	54.00	54.00	63.00	60.00
T. Hardness/CaCO3, mg/l	105.30	103.20	105.70	119.40	52.20	36.50	50.60	67.60	76.30	75.90	88.70	92.10
Turbidity, NTU	0.20	0.44	2.30	1.00	3.20	1.70	0.53	0.17	0.14	0.14	0.39	0.14
Sp.Cond. umhos/cm.	272.00	285.00	373.00	388.00	165.00	107.00	122.00	174.00	221.00	223.00	240.00	245.00
TDS@180C, mg/l	158.00	162.00	202.00	142.00	94.00	66.00	76.00	100.00	120.00	124.00	150.00	140.00
NO2+NO3 dis	0.19	0.19	0.31	0.36	0.24	0.23	0.64	0.15	0.14	0.14	0.17	0.16
D-Mercury, ug/l	<0.2	<0.1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
CO3 Solids	39.00	39.00	34.00	38.00	22.00	20.00	22.00	28.00	32.00	32.00	38.00	36.00
D-T.Phos., mg/l	0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Field Data												
Temp, C	2.90	3.20	3.80	3.50	4.30	4.40	6.90	7.50	6.70	5.30	3.40	2.90
Flow, cfs	40.00	12.05		46.93								
pH	7.90	8.40	7.30	7.60	7.60	7.70	7.80	7.80	8.00	7.80	7.90	7.50

APPENDIX F

INORGANIC BACKGROUND SOIL SAMPLES SALT LAKE AREA

INORGANIC BACKGROUND SOIL SAMPLES SALT LAKE AREA

	KI-SS-40M (7)	BT-SO-3 (8)	BP-SO-1 (9)	PC-SO-1 (10)	AB-SO-8 (11)	AB-SO-9 (11)	TC-SO-1 (12)	OC-SO-1 (13)	RO-SO-04 (14)	RS-SO-04 (15)
Aluminum	14900.00	8700.00	6430.00	Q	9080.00	6370.00	Q	Q	9920.00	15700.00
Antimony	3.25ND	Q	Q	2.5ND	2.7ND	2.25	Q	Q	5.9ND	6.2ND
Arsenic	Q	16.50	7.90	11.50	Q	Q	Q	Q	9.40	Q
Barium	197.00	167.00	104.00	544.00	208.00	209.00	Q	152.00	126.00	172.00
Beryllium	0.81	0.63	0.52	0.58	0.48ND	0.4ND	0.1ND	1.00	0.58	0.93
Cadmium	.37ND	0.79	0.46ND	2.00	2.10	2.50	1.70	2.50	0.85	1.70
Calcium	45000.00	87100.00	121000.00	67800.00	81100.00	66100.00	Q	Q	50700.00	92400.00
Chromium	17.60	Q	Q	17.70	18.00	15.00	Q	15.80	16.50	20.60
Cobalt	7.90	6.06	4.80	5.40	3.50	6.40	4.60	4.10	6.00	7.60
Copper	46.20	46.30	24.60	Q	Q	70.00	Q	Q	47.50	108.00
Iron	16800.00	9420.00	7930.00	12400.00	10200.00	13200.00	Q	Q	14800.00	20800.00
Lead	Q	155.00	41.30	Q	327.00	313.00	166.00	Q	214.00	306.00
Magnesium	14800.00	Q	35700.00	7650.00	9870.00	7860.00	Q	Q	12400.00	12500.00
Manganese	578.00	Q	314.00	306.00	Q	Q	Q	Q	293.00	343.00
Mercury	.05ND	0.08	0.05ND	0.06ND	Q	Q	Q	Q	0.22	0.17
Nickel	15.00	20.70	9.20	12.10	16.00	13.00	4.10	12.20	13.80	14.80
Potassium	Q	3970.00	1680.00	2610.00	2850.00	1840.00	925.00	2090.00	3290.00	4760.00
Selenium	2.4ND	0.11ND	Q	Q	0.19	0.19	Q	Q	0.25ND	0.54ND
Silver	.48ND	Q	0.46ND	.65ND	2.70	0.85ND	Q	6.3ND	0.98	1.1ND
Sodium	131ND	474.00	184ND	290ND	313.00	391.00	Q	270.00	566.00	780.00
Thallium	.24ND	0.31	0.23ND	Q	Q	Q	1ND	Q	0.32	0.67
Vanadium	21.60	Q	14.90	19.70	15.00	13.00	20.00	16.00	24.10	32.30
Zinc	Q	Q	Q	Q	216.00	261.00	Q	Q	103.00	138.00

Measured in parts per million (ppm)

INORGANIC BACKGROUND SOIL SAMPLES SALT LAKE AREA

	BM-SO-01 (1)	BM-SO-02 (1)	MF-SO-01 (2)	RP-SO-02 (3)	MW-SO-01 (4)	GE-SO-01 (5)	HBS-1 (6)	HBS-2 (6)	HBS-3 (6)	KT-SS-37L (7)
Aluminum	14000.00	15400.00	3040.00	7390.00	6790.00	12900.00	6660.00	9640.00	8330.00	13300.00
Antimony	Q	Q	Q	7.40	Q	3ND	1.2ND	3.90	1.3ND	3ND
Arsenic	21.60	24.20	3.40	Q	13.90	8.30	9.40	14.60	20.80	Q
Barium	235.00	197.00	Q	85.80	Q	Q	88.30	121.00	109.00	154.00
Beryllium	2.20	1.90	0.1ND	0.38	0.53	0.82	0.34	0.56	0.26	0.78
Cadmium	2.00	1.90	Q	0.45ND	0.66	1.20	0.1ND	0.25	0.36	0.34ND
Calcium	6830.00	4020.00	10400.00	41800.00	38300.00	48600.00	34600.00	45800.00	39500.00	54700.00
Chromium	17.40	22.90	8.10	8.90	Q	19.40	10.00	14.60	12.00	17.90
Cobalt	11.80	14.80	3.10	4.90	8.80	8.80	4.10	5.90	5.10	7.10
Copper	57.80	50.00	21.50	Q	36.10	41.00	28.00	63.60	Q	44.10
Iron	20700.00	172200.00	Q	8840.00	Q	16600.00	10300.00	15900.00	12900.00	15600.00
Lead	91.10	80.70	53.00	50.00	Q	42.80	39.80	54.80	90.40	Q
Magnesium	4160.00	4370.00	3690.00	11700.00	7710.00	11900.00	7880.00	11700.00	10500.00	13100.00
Manganese	654.00	758.00	Q	213.00	263.00	521.00	204.00	334.00	278.00	374.00
Mercury	0.18	0.12	0.05ND	0.06ND	0.06ND	0.05ND	Q	Q	Q	0.05ND
Nickel	18.60	19.70	5.60	11.00	Q	17.20	7.60	13.70	9.90	13.80
Potassium	5590.00	5430.00	Q	4000.00	1970.00	5000.00	2580.00	3350.00	3030.00	Q
Selenium	0.58	0.13ND	Q	Q	Q	0.13ND	Q	Q	Q	2.25ND
Silver	0.48ND	0.47ND	Q	0.45ND	Q	0.5ND	Q	Q	Q	0.45ND
Sodium	153.00	119.00	109.00	13100.00	101.00	183ND	253.00	203.00	204.00	220.5ND
Thallium	.27ND	0.25ND	0.29ND	0.23ND	0.41	0.25ND	0.11ND	0.23	0.32ND	0.23ND
Vanadium	36.80	34.80	10.10	13.70	13.70	24.80	19.70	25.90	22.60	25.60
Zinc	89.50	74.00	Q	44.50	Q	Q	Q	Q	Q	Q

Measured in parts per million (ppm)

INORGANIC BACKGROUND SOIL SAMPLES SALT LAKE AREA

	SC-SO-06 (16)	UC-SO-1 (17)	DPSO-9 (18)	Mean	St. Dev.	# of Sample
Aluminum	9270.00	9730.00	7430.00	9749.00	3516.93	20
Antimony	19.00	Q	19.00	10.31	8.15	13
Arsenic	11.90	Q	35.20	14.90	8.26	15
Barium	149.00	192.00	Q	178.34	101.45	19
Beryllium	0.71	0.2ND	0.57	0.78	0.50	23
Cadmium	0.96	0.86ND	1.90	1.46	0.74	21
Calcium	58600.00	244000.00	112000.00	64302.38	51566.15	21
Chromium	20.00	8.50	17.80	15.72	4.33	19
Cobalt	Q	3.20	4.40	6.29	2.85	22
Copper	64.10	Q	58.70	50.47	20.92	16
Iron	14600.00	5640.00	10200.00	21527.89	36715.68	19
Lead	90.10	17.20	163.00	127.51	101.36	18
Magnesium	10400.00	4710.00	7270.00	10493.50	6770.65	20
Manganese	233.00	123.00	215.00	353.18	173.85	17
Mercury	0.11ND	0.1ND	0.28	0.18	0.07	15
Nickel	14.50	9.1ND	10.90	13.02	4.30	22
Potassium	3330.00	2530.00	2280.00	3155.25	1294.90	20
Selenium	0.71	Q	Q	0.42	0.27	10
Silver	0.87ND	Q	1.00ND	1.84	1.22	13
Sodium	266.00	525.00	318.00	1067.35	3106.18	21
Thallium	0.44	0.6ND	0.25	0.38	0.15	18
Vanadium	42.40	15.60	15.90	21.74	8.54	22
Zinc	102.00	809.00	224.00	206.10	223.65	10

Measured in parts per million (ppm)

REFERENCES
BACKGROUND SOIL DATA (CLP Validated-METALS)
IN THE SALT LAKE CITY AREA, MAY 21, 1991

1. UBERR, 1991 (Draft). Analytical Results Report, Butterfield Mine Site, Salt Lake County, Utah, Table 2.

2. UBERR, 1990. Analytical Results Report, Mineral Fertilizer, Davis County, Utah, Table 4.

3. UBERR, 1991 (Draft). Analytical Results Report, Rose Park Canals (Northwest Oil Drain), Salt Lake County, Utah, Appendix E.

4. UBERR, 1991. Analytical Results Report, Utah Metal Works, Table 6.

5. UBSHW, 1990. Analytical Results Report, General Electric Apprartus Service Shop, Davis County, Utah, Table 5.

6. UBSHW, 1990. Analytical Results Report, Highland Boy Smelter Site, Salt Lake County, Utah, Table 3.

7. UBSHW, 1990. Analytical Results Report, Kennecott Tailings Pond, Salt Lake County, Utah, Table 3.

8. U.S. EPA, 1989. Analytical Results Report, Barber Company Tar Products, Salt Lake City, Utah, Table 4.

9. U.S. EPA, 1989. Analytical Results Report, Bennett Paint/Karpowitz Coal Facility, Salt Lake City, Utah, Table 2.

10. U.S. EPA, 1990. Field Activities and Analytical Results Report for Petrochem/Ekotek Plant, Salt Lake City, Utah, Table 13.

11. U.S. EPA, 1988. Report of Analytical Results, American Barrel, Salt Lake City, Utah, Table 2.

12. U.S. EPA, 1988. Report of Analytical Results, Thatcher Chemical Company, Salt Lake City, Utah, Table 8.

13. U.S. EPA, 1991. Final Site Inspection, Old Continental Dry Cleaners, Salt Lake City, Utah, Table 1.

14. UDERR, 1992. Analytical Results Report, Redwood Road Dump, Salt Lake City, Utah, Table 5.

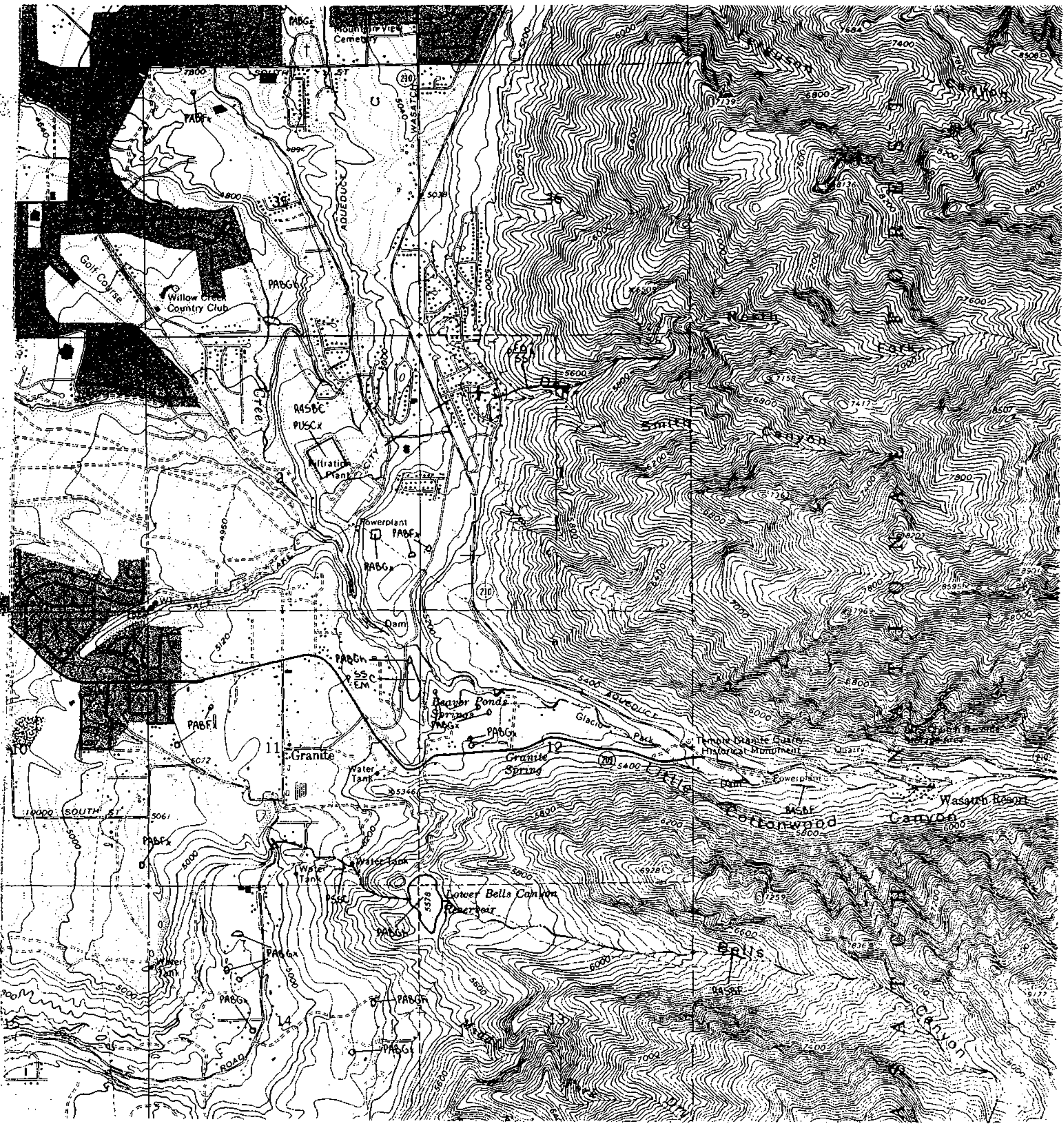
15. UDERR, 1991. Analytical Results Report, Radio Station Properties, Salt Lake City, Utah, Table 7.

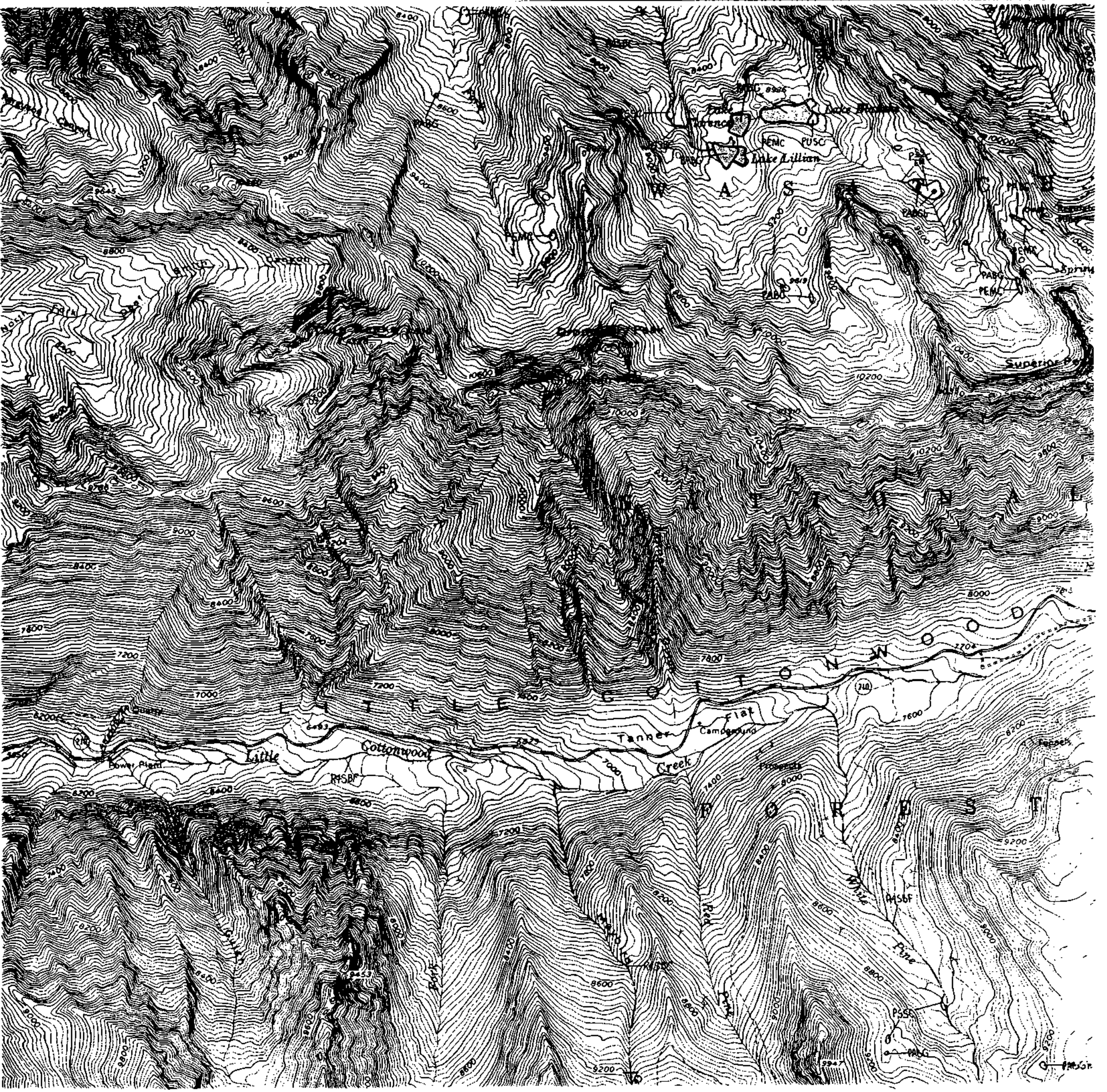
16. UDERR, 1991. Analytical Results Report, Stone Container Corporation, Salt Lake City, Utah, Table 5.

17. U.S. EPA, 1991. Final Site Inspection Report, Union Carbide - Linde Division Site, Salt Lake City, Utah,

APPENDIX G

WETLAND LOCATIONS ALONG LITTLE COTTONWOOD CREEK


Mountain View Cemetery
SOUTH ST
WASATCH
AQUEDUCT
Golf Course
Willow Creek Country Club
Filtration Plant
Powerplant
Dam
Beaver Ponds Springs
Granite
Granite Spring
Water Tank
Lower Bells Canyon Reservoir
Glacial Park
Temple Granite Quarry Historical Monument
Quarry
Little Cottonwood Canyon
Wasatch Resort
North Fork
Smith Canyon
Bells Canyon
10000 SOUTH ST
ROAD



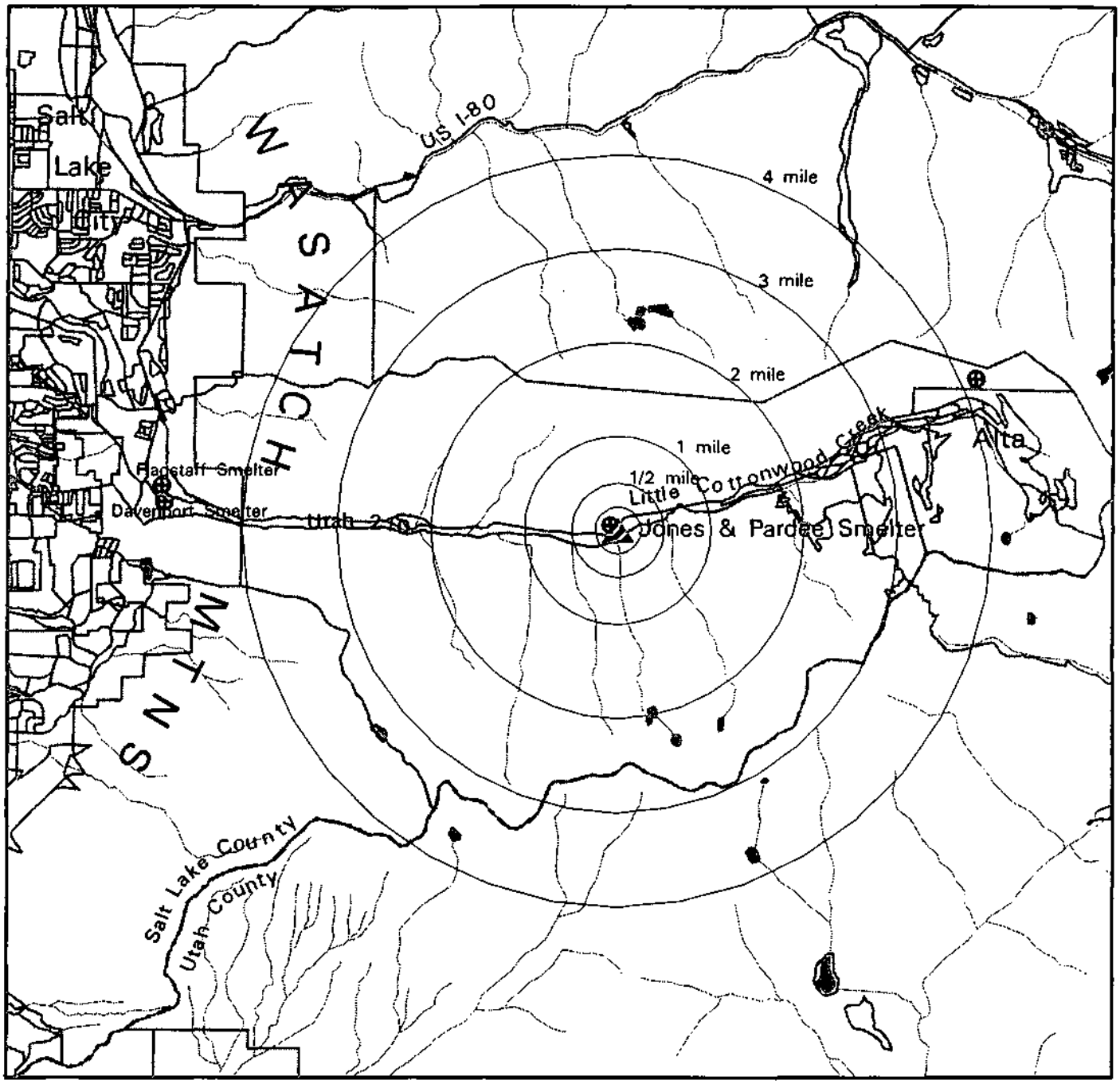
Lake Lillian
W A S A T C H
N A T I O N A L
F O R E S T
L I T T L E C O T T O N W O O D
Little Cottonwood Creek
Tanner Flat
Campground
Power Plant
Prospects
White Pine

APPENDIX H

POPULATION BY CENSUS BLOCK

APPENDIX H

POPULATION BY CENSUS BLOCK



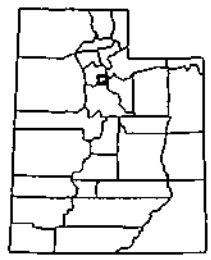
Population Density by Census Block
Jones & Pardee Smelter

N

Scale
1" = 1.63 Miles

Legend

- Site
- Census Blocks
- Concentric bands
- CERCLIS Sites
- Hydrography
- County boundaries



UDEQ
Division of Environmental
Response and Remediation

file: joneblk.map created by: eqerr on 06/22/95

Population by Census Block and Concetric Bands
Site Theme: cercla
Site Name: jonespar
Created By: eqerr
Created On: 06/22/95

Block	1/4 MILE		1/2 MILE		1 MILE		2 MILES		3 MILES		4 MILES	
	PCT	POP	PCT	POP	PCT	POP	PCT	POP	PCT	POP	PCT	POP
0354728110102345B	14	6	29	12	40	15	61	24	77	31	100	41
0354790110102310	0	0	0	0	0	0	0	0	57	17	100	29
0354790110102311A	0	0	0	0	0	0	0	0	60	3	100	5
049P151010298202F	0	0	0	0	0	0	0	0	2	2	12	14
0354790110102315	0	0	0	0	0	0	0	0	58	2	100	3
0354790110102316	0	0	0	0	0	0	0	0	74	2	100	2
0354790110102304	0	0	0	0	0	0	0	0	0	0	100	110
0354790110102306	0	0	0	0	0	0	0	0	0	0	100	56
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0354398110102497	0	0	0	0	0	0	0	0	0	0	31	0
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049P151010298299D	0	0	0	0	0	0	0	0	0	0	100	0
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0354738110102399D	0	0	0	0	0	0	0	0	100	0	100	0
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0354790110102341	0	0	0	0	0	0	0	0	100	0	100	0
0354790110102342	0	0	0	0	0	0	0	0	100	0	100	0
0354790110102344E	0	0	0	0	0	0	0	0	7	0	100	0
0354790110102347	0	0	0	0	0	0	0	0	100	0	100	0
0354398110102408	0	0	0	0	0	0	3	0	19	2	42	5
0354728110102491	0	0	0	0	0	0	2	0	100	0	100	0
0354738110102348	0	0	0	0	0	0	9	0	100	0	100	0
0354738110102399F	0	0	0	0	0	0	53	0	100	0	100	0
0354790110102340	0	0	0	0	0	0	18	0	100	0	100	0
0354790110102343	0	0	0	0	0	0	90	0	100	0	100	0
0354790110102349	0	0	0	0	0	0	100	0	100	0	100	0
0354790110102350	0	0	0	0	0	0	100	0	100	0	100	0
0354790110102351	0	0	0	0	0	0	100	0	100	0	100	0
0354738110102490	0	0	0	0	100	0	100	0	100	0	100	0
0354790110102344D	0	0	0	0	31	0	100	0	100	0	100	0
0354728110102488B	1	0	3	0	13	1	45	6	71	9	91	11
0354738110102344C	0	0	2	0	10	0	43	0	88	0	100	0

TOTAL 1/4 MILE	6.000000
TOTAL 1/2 MILE	12.000000
TOTAL 1 MILE	16.000000
TOTAL 2 MILE	30.000000
TOTAL 3 MILE	68.000000
TOTAL 4 MILE	372.000000